THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. OCTOBER 21, 1897. CHICAGO, ILL. NUMBER 42

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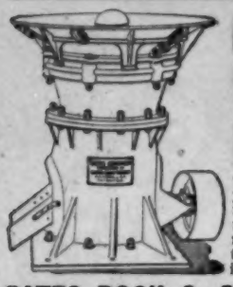

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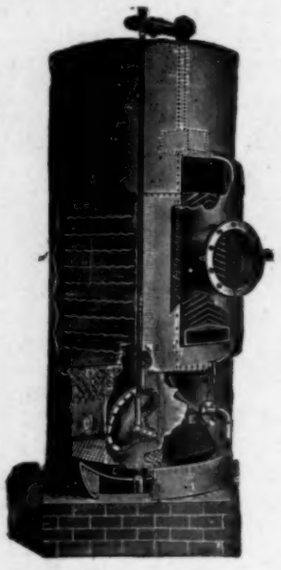

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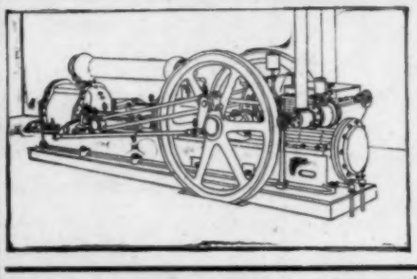

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THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. OCTOBER 21, 1897. CHICAGO, ILL. NUMBER 42

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The feature of the week's news in iron and steel is the serious aspect of the drought in the coke country. One Connellsville producer has banked 1,000 ovens because of scarcity of water; another is concentrating operations in plants best supplied with water, and one furnace company has had to close down its coke works entirely. Coming at a time of year when shrunken mountain streams are getting past the possibility of any great replenishment until spring, the scarcity of water is most unwelcome. It is particularly so in view of the enlargement of blast furnace operations in the past month. Winter coke prices may yet have a chance to advance under the natural operation of supply and demand. In other respects no change has come over the situation in the past week. New demand for rolled products is coming up steadily, but not in a way to cause any change in prices. The past ten days have been quieter, indeed, in some finished lines than the weeks immediately preceding, yet the mills, with from one to three months' orders on their books are not pressing the situation, and the intangible line between 1897 and 1898 has all the effect of a stone wall with some makers. There is so much confidence on the selling side that business not likely to figure in the market until after the opening of the new year will be of large volume, that many are not willing to be governed by considerations belonging to to-day's situation. The monthly blast furnace statement showing pig iron production on Oct. 1 at a yearly rate close to 10,500,000 gross tons — and this has grown through October additions—taken in connection with a stock reduction of 170,000 tons in September, naturally gives strong support to optimistic views. Sellers of foundry iron are generally disposed to be firm, but there is competition for current orders, though it is noticed that sellers' prices vary less than at any time since the advance began. Some Northern furnaces that have been taking business from Southern competitors are now asking more money. This is true in the Pittsburg district and in the market usually considered tributary to valley furnaces. Bessemer iron has ben quiet, but the market is very steady under two weeks of letting alone. For October delivery, $9.90 valley is the figure, $10 to $10.10 for delivery in the balance of the year, and $10.50 appears to be the lowest that furnacemen would entertain on deliveries in early 1898. The coke situation makes sellers more cautious than ever. Before the drought had become so much of a factor buyers were tending to the belief that the willingness of producers in districts competing with the Connellsville to make current prices on deliveries in 1898 would preclude any considerable advance by the leading interest. Billets for prompt delivery are confined to speculators, and $16.50 to $16.75 is the Pittsburg quotation, though little is doing. The wage trouble at the Bellaire plant and a temporary breakdown at another Ohio mill have tended to strengthen the situation. Finishing mills in the Pittsburg and Chicago districts find that even with the smaller demand of the past two weeks, the new business is practically keeping pace with output.

THE CLEVELAND DISTRICT.

Iron Ore. A little buying continues, an inquiry for 25,000 tons of one kind being in the market, but on the basis of the average closing of navigation the selling season is closed for nearly all interests. Offers on a possible 90,000-ton transaction, most of them at an advance of 30 to 50 cents, were not accepted. Any attempt now to make out a mixture would probably be futile. A prolongation of open weather, of which there is some prospect, would make a little more available from certain mines. A lowering of rates before the close of navigation, which must be counted as a possibility, since chartering at 65 cents from Duluth is light, would aid in bringing down even more than the enormous expected amount, though it is doubtful that mines having an allotment, and yet declining to operate on account of the low prices of the year, would now attempt to make a small output. It is apparent that most of the ore is covered by season contracts. With a general association next year, it is conceded that prices will be a little, and only a little, higher, but hardly different in the event of a failure to organize.

Pig Iron. The activity in Bessemer of a month ago is followed by the anticipated lull, as a rule the seller having disposed of all he has for the year, and the buyer taken all he wants for the present. This, with the effect of speculative operations, has made possible such a sale as one of 2,000 tons at $9.82, valley furnace, November delivery, but the recession of stocks, with capacity almost at the limit, is foundation for the expectation of another stronger wave. Agreements are not reached on next year's business, and little attempt is made to do so. There is some doubt that coke will cost but little, if any more than now. While the partial satisfaction of foundry requirements has slightly lessened activity, quotations are firmly held at $10 for No. 2. Little buying of mill iron is in progress, there being hardly any to sell, but quotations stay at $9.25, valley furnace, because heavy stocks bought in the summer are not yet consumed.

Bessemer	10 65	Valley Scotch No 1	$10 65@10 90
No. 1 Strong Foundry	10 65@10 90	Valley Scotch No. 2	10 15@10 40
No. 2 Strong Foundry	10 15@10 40	Gray Forge	9 65@ 9 90
No. 3 Foundry	9 90@10 15	Lake Superior Charcoal	12 25@12 50

Finished Material. The feature of the situation is the overbooked condition of nearly all mills for this year's delivery. Mills decline to undertake new year contracts, some exceptions involving tin plate and bars and agricultural iron, and buyers are inclined to see material ordered on hand before placing further ahead. Structural material is very firm on a basis of $1.10 for beams, and good advances are obtained on deliveries out of stock. There are no tonnages of conspicuous proportions. Old material is not so feverish, but outside of speculative transactions the past fortnight has shown a good business. Relaying rails, $15.50; old iron rails, $15; No. 1 railroad wrought scrap, $12; good busheling scrap, $10.50; wheels, $11.50; steel rails, $10.50.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Oct. 20.

Transactions last week were not very very heavy and did not include any especially large orders. This was due, to a large extent, to the fact that the mills and furnaces are full of orders for the balance of this year, and in many cases for the first two or three months of next, and are not anxious to increase the tonnage on their order books at present. If manufacturers were willing to sell their output for several months into next year at the prices prevailing at present, there is little doubt that buyers could be found. As a rule, however, buyers who want to make contracts for material to be delivered beyond the first of the year find they have to pay some advance on the present prices to place their order. Both buyers and sellers are looking for a heavy business after the first of the year, and judging from the fact that consumers are using material about as fast as the mills and furnaces can make it for them, there is every probality that sales will be fully as heavy in the first six months of next year as they have in the past six months, if not heavier.

PIG IRON.—Sales last week were not very heavy. Most of the buying was in lots of 500 tons or smaller, and the bulk of the business closed was in carload lots, or only a little larger. The furnaces are all very firm in their views, and are making no concessions to secure business, as with no exceptions they have well filled order books, and are independent as to the immediate future. Prices are unchanged, and in a good many cases buyers find that they have to pay an additional 25 cents a ton for iron to be delivered next year. The Southern furnaces are all asking that much more, and have refused business in the last week where the buyer did not want to pay the additional price asked. The foundries in this territory are getting busier all the time, and, with the exception of the architectural iron foundries and the small jobbing foundries, are doing more business than they have for a long time before. There is considerable talk of an advance in Southern freight rates, and one may be made within the next few weeks, although nothing definite has been decided.

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 35@10 60
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	11 00@11 25
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 60@10 85
Local Coke Fdy. No. 3	10 50@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	11 00@11 25	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 60@10 85	Coke Bessemer	11 50@12 00

BARS.—Orders last week included several of quite large size, although the total business of the week was hardly as large as that of the week previous. Car builders are still securing some orders, but not so many as were being closed a little while ago, nor are they so large. General business in small lots is good, both from mill and from store. Prices are as firm as possible, and are made at 1.15c to 1.20c for common iron, 1.20c to 1.25c for guaranteed iron, and 1.20c to 1.25c for soft steel bars from strictly billet stock.

RAILS AND TRACK SUPPLIES.—The local mills report a quiet week, with no orders of consequence. The demand for light sections is large, and sales are keeping up well. The market is very firm. Prices are as follows: Rails, $20.50 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—There has been very little business in this market and most of what has been going was secured by Eastern mills, as the local mills are filled up until the end of the year. Prices are unchanged and are nominal at $18 to $18.50 for billets and $25 to $25.50 for rods.

STRUCTURAL MATERIAL.—The only new large contract that has come up in the week was one for 1,000 tons for a new office building on Dearborn st. which, it is understood, is to be constructed immediately by the Heisen interests. The Western Electric Co. is to build an addition to its plant that will take about 600 tons. General business has been very large, and orders from the various structural shops in this territory are heavy. Most of them are filled up with railroad work. Quotations are unchanged and are very firm. They are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.20c to 1.25c; tees, 1.30c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—There has been considerable talk of the ships to be built by the Rockefeller interests, and of thematerial to go into them. The local mills, however, are not competing for the business, as they have their order books so well filled that it would not be possible for them to accept very much more business. One contract of about 1,000 tons for a vessel to be built at Detroit was taken here last week. General business, from both mill and from store, has been large. Quotations are made as follows: Tank steel, 1.20c to 1.25c; flange steel, 1.30c to 1.40c; fire-box steel, 1.85c to 5c.

SHEETS.—Business continues to be quite good, and orders were fully as large last week as they were the week previous. Store business in small lots was especially good. Quite a few mills are asking higher prices than those we quote. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 5 to 80 and 2½ per cent discount for galvanized.

MERCHANT STEEL.—Considerable inquiry is being received all the time, but the mills are not anxious for business, having well filled order books, and are not trying to secure orders. As a consequence sales were not as large as they would otherwise have been. Quotations are very firm and in some cases are made higher than those we give: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—There have been several sales of large amounts in the past week, although most of it was for delivery outside of Chicago. The business is extensive, covering all grades of scrap, and appears to be growing larger every week. The largest sale of last week was one of over 1,000 tons, of several grades. Dealer's selling prices are as follows:

Old iron rails, gross	$12 50@$13 00	Axles, net	$14 00@$14 25
Old steel rails, long, gr	9 50@ 10 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 50	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 25	Mixed steel, gross	..... 7 00
Dealer's forge, net	10 00@ 10 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel gr.	8 00@ 8 25
Heavy cast, net	7 7 @ 8 25	Old iron splice b., net	13 50@ 14 00
Malleable cast, net	9 00@ 9 25		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, Oct. 20.

PIG IRON.—Prices of Bessemer iron hold steady notwithstanding the fact that little is being done. Sales during the week have been very few, but $9.90 valley is accepted as minimum for October and $10 for this year. Little is said of next year. Furnaces producing foundry grades have notified selling agents to stand for $10.65 on No. 2 and $11 on No. 1. Quotations are accordingly advanced but have not been tested. Mill iron is again scarce and $9.75 to $9.90 Pittsburg is asked for this year. Quotations follow:

Bessemer, valley	$9.90	to	10.10
Bessemer delivered Pittsburg District	10.50	to	10.75
No. 1 Foundry	11.00	to	11.25
No. 2 Foundry	10.65	to	10.90
No. 3 Foundry	9.75	to	10.00
Gray Forge, Pittsburg	9.75	to	10.00

BILLETS.—Labor difficulties in Wheeling district mills have so far been little felt in prices of steel, but the unfilled orders are now beginning to come into the market for supply and may still further advance prices. Mill quotations on billets are $16.50 to $16.75 and on rods are $24 to $24.25. Sheet bars are held at $18.50 to $18.75 and are very hard to find. The trouble from delayed shipments is keenly felt by sheet and tin mills.

RAILROAD AND TRACK MATERIAL.—Standard sections of new rails are quoted at $21, mill. For 60-lb. relaying rails, Buffalo, Cleveland or Pittsburg, $15.50 to $15.75 is asked, depending on condition Edgar Thomson is booked for the year by the Pennsylvania railroad purchase. The old mill is temporarily idle. On track material we quote: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

PIPES AND TUBES.—Except to heavy dealers buying in large quantities, the second discount of 10 per cent recently established is a firm minimum on merchant pipe. Base discounts are quoted as follows: Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. Mills are fully booked. Discounts on merchant boiler tubes are as follows:

2¼ inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

STRUCTURAL MATERIAL.—The fall turn in structural business has appeared and inquiries are fewer than for weeks past. Current orders are taking the full mill capacity and fitting shops are behind. Beams are holding at 1.10c for 15 inches and under and 1.20c for 18 to 24 inches. Mills are quoting: Angles and universal plates, 1.05c to 1.10c; tees and zees, 1.20c to 1.25c.

PLATES.—Mills are quoting: Bessemer and open-hearth tank, 1.05c to 1.10c; shell, 1.10c to 1.15c; flange, 1.15c to 1.20c. A falling over in orders has been general in the last 10 days but the demand is yet strong and prices undisturbed.

BARS.—There is much trouble in getting deliveries on steel bars, and in some instances mills are compelled to refuse business till they catch up. For steel bars 1.05c to 1.10c is paid. Bar iron demand is better in the valleys but little changed locally. Mills ask 1.05c on common and 1.35c for best all muck bars.

SHEETS.—The manufacturers' agreement is so far not effective owing to the famine prices paid for small gauges. The complaint over delayed shipments grows and is almost universal. In view of conditions No. 28 black for prompt use is bringing $2.20 and No. 27, $2. Black plates for tinning are quoted at $2.25. Galvanized sheets have sold at 80 and 2½ per cent. off and 80 is asked. Manufacturers' prices on other gauges are as follows: No. 30, 2.40c; No. 29, 2.25c; No. 27, 2.05c, and on Nos. 25 and 26, 2c.

FERRO-MANGANESE.—Domestic ferro-manganese, 80 per cent, is strong at $46 and $46.50 is asked.

OLD MATERIAL.—Wrought scrap is selling and is quoted higher. An offer of $12.10 net was refused in the week for railroad wrought, and $13 gross net is said to have been done on a 500-ton lot. A lot of 1,000 tons of old iron rails is reported sold at $15 and steel rails in mixed lengths have brought $11.25. Cast scrap is quoted at $9, gross, and car wheels at $11, gross.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati. During the past week there has been the usual run of small orders, with a few of notable size. One of the Ohio malleable iron firms covered its wants for coke iron with deliveries, it is said, running through 1898. One furnace company that was asked to quote put up its price $1 per ton, fearing an advance in both ore and coke. The coke situation is apparently mixed, for while an advance is intimated in certain districts, other producing fields of importance are willing to contract at present figures for 1898. The Pocahontas Co., on Oct. 1, withdrew from its former selling arrangements and changed its agents. It controls about 2,800 ovens and is the ruling factor in that district. Northern irons have sold quite freely, and a number of inquiries have been made for Lake Superior charcoal brands. Southern car wheel iron transactions are principally confined to the Rome, Ga., furnace that has run steadily, in spite of the depression in that class of material. Several sales of 500-ton lots at full prices were made. We quote for cash, f.o.b. cars Cincinnati: Southern Coke, No. 1 foundry, $10; No. 2, $9.75; No. 3, $9.45; gray forge, $9.25; mottled, 9; No. 1 soft, $10; No. 2, $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; No. 2, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co., silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

Buffalo. The drought in the coke country is being felt here and foundries seem to be more interested just now in getting sufficient fuel supply to keep them running than in iron matters. At the same time, several fair sized contracts have been made in the week for delivery running through the balance of the year, and at present prices. The temporary drop in Bessemer had no effect on the local foundry iron market. In fact, the feeling here is firmer. Sales have not been quite so numerous, but incline towards larger amounts. Lake Superior charcoal has been rather active, as malleable and car wheel works are laying in their winter's supply. Shipments from local furnaces have been very heavy. We quote below on the cash basis, f.o.b. cars Buffalo: No. 1 strong foundry iron, $11.25; No. 2 strong foundry coke iron, Lake Superior ore, $10.75; Ohio strong softener, No. 1, $11.75; No. 2, $11.25; Jackson Co. silvery, No. 1, $14; Southern soft, No. 1, $11.75; No. 2, $11.35.

THE TIN PLATE MARKET.

The market during the past week has been stagnant and little interest has been shown by buyers, the weakness being attributed to the reports recently published regarding the expansion of tin plate capacity, this has had a decided effect upon a market already weak and lifeless.

There has been comparatively little business doing either for nearby or future deliveries and no quotable change has taken place in the prices actually made, but the general situation is weak.

We quote as follows, f.o.b. maker's mill Indiana or Pittsburg district:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb. Basis weight,	$3.00
100 lb. " "	2.90
95 lb. " "	2.85
90 lb. " "	2.80
85 lb. " "	2.75
80 lb. " "	2.70

TERNE PLATES.

IC, 216 lb., 20 x 28	$5.95
200 lb. "	5.65

OBITUARY.

WILLIAM H. ONDERDONK.

William H. Onderdonk, secretary of the Streeter-Amet Weighing & Recording Co., of Chicago, died at his home in Evanston, Ill., Oct. 15, of cancer. Mr. Onderdonk was born in New York City forty-five years ago, and came to Chicago only a few years ago. He was a son of Bishop Onderdonk, of New York, and a brother of Andrew Onderdonk, the well-known contractor. He left a widow and six sons.

GEORGE M. PULLMAN.

George M. Pullman, president of the Pullman Palace Car Co., died suddenly at his residence in Chicago, on Tuesday of this week, of heart failure. Mr. Pullman's death was most unexpected, as, while he had not been in the best of health during the summer, he had of late been very well.

Personal.

Albert B. Duff of the Duff Patents Co., Pittsburg, is home from Europe, where he spent the summer for the benefit of his health.

John MacGeorge read an interesting paper on "The Mechanical Side of Steel-Making" before the Civil Engineers' Club, Tuesday evening, Oct. 12. The latest devices for mechanically charging open-hearth furnaces were described, with accompanying lantern views, particular attention being given to the Wellman charging apparatus.

Charles Lowthian Bell, son of Sir Lowthian Bell, and Walter L. Johnson, of Middlesbrough, Eng., who are making a tour of the United States, visiting prominent iron and steel manufacturing plants, have spent the past week on the Gogebic, Mesabi and Vermilion ranges and at Chicago.

THE Pocahontas Co., controlling about 2,800 ovens in the noted Flat Top district of Virginia, has appointed Rogers, Brown & Co. sales agents for its 72 hour foundry coke. This coke has attained great popularity on account of its low ash and sulphur. A large consumer analyzed 375 cars and found the percentage of ash to be 5.81, and on another occasion 953 cars showed an average of ash 6.44 per cent.

THE quietness in pig iron has extended to rolled products during the week for which both demand and inquiry have receded to about the capacity of the mills. Like iron, however, prices on finished lines have weakened none and price is less of a consideration than delivery.

A DISPATCH from Bellefonte, Pa., says that Rogers, Brown & Co., of Cincinnati, have leased the entire plant, furnace and ore mines of the Valentine Iron Co., and will prepare for a resumption of the works on Nov. 1. The plant has been closed for nearly two months.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

OCTOBER 21, 1897.

THE next issue of the *Iron Trade Review* will be a special foundry number. It will contain the proceedings of the Cincinnati meeting of the Western Foundrymen's Association and much other matter particularly relating to the foundry interests.

THE OUTWARD MOVEMENT IN IRON AND STEEL.

Month by month the record of iron and steel shipments out of the United States gives cause for congratulation. On the other hand, each month's statement shows smaller imports of the products of foreign mills. The money value of imports and exports for the month of August and for the eight months ending with August, in 1896 and 1897, makes an exhibit from which the trend can be readily gathered:

	AUGUST.		JAN.—AUG.	
	1896.	1897.	1896.	1897.
Iron and Steel Imports	$1,766,067	$887,344	$14 810,848	$9,954,956
Iron and Steel Exports	4,096,642	5,049,865	29,957,090	40,757,920

In other words, while August iron and steel imports were half those of August, 1896, in value, August exports of iron and steel and their manufactures, including machinery, were one-fourth greater than in August, 1897. For the eight months ending with August the movement in fell off one-third, as compared with the corresponding eight months of 1896; in the same time the movement out increased one-third, using value as the basis of comparison.

As the entire trade at home is watching narrowly these important changes, we have given the figures as they are presented month by month in the statistical statements of the Treasury Department, going into detail as to the items of exports, as there is a general desire to know how this business is developing. Pig iron is holding an even rate of export, which has not been as great as some of the reports from the South in mid-summer would have had us believe. July and August each had a total very close to 16,000 tons. Other conspicuous items in the export column, also, are scrap, of which 11 times as much was sent abroad this year to the end of August as in the same period last year; steel bars, rails and wire:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	August.		Jan.—Aug.	
	1896.	1897.	1896.	1897.
Pig iron { ferro }	2,011	{ 1,043	20,114	{ 2,532
Pig iron { all other }		{ 14,952		{ 151,395
Scrap	50	6,940	745	29,685
Bar iron	127	281	2,710	2,969
Steel bars (not wire rods)	756	1,017	2,668	36,208
Iron rails	90	7	546	4,300
Steel rails	11,750	9,201	33,807	70,313
Billets, ingots and blooms	(a)	1,475	(a)	2,220
Hoop, band and scroll	5	215	154	515
Wire rods	(a)	3,443	(a)	5,363
Iron sheets and plates	29	499	397	2,339
Steel sheets and plates	31	194	446	1,528
Structural material	(a)	2,802	(a)	3,828
Wire	3,457	4,688	22,357	34,311
Cut nails	919	1,060	7,225	10,164
Wire nails, }	268	842	2,699	{ 1,718
Other, including tacks }		178		{ 2,723
	19,483	48,837	93,868	368,118

(a) Not separately stated prior to July, 1897.

A total of 368,118 tons of furnace and rolling mill products sent out of the country in eight months, or at the rate of 46,000 tons a month, is no mean showing for a trade that is only in its beginnings. To this tonnage is to be added that of our machinery exports which are only stated in value, not in weight. From January to August inclusive these were $12,013,971, as against $10,651,590 in 1896 to the end of August. As 1896 was a good year for machinery exports, to gain upon it is gratifying.

The import table, with the usual comparisons is given below:

IRON AND STEEL IMPORTS TO THE UNITED STATES.—GROSS TONS.

	August.		Jan.—Aug.	
	1896.	1897.	1896.	1897.
Pig iron	4,173	733	49,639	9,853
Scrap iron and steel	240	25	6,369	699
Bar iron	1,503	1,076	16,645	8,069
Iron and steel rails	3,111	23	3,217	138
Hoops and band iron	.....	.....	34	.....
Sheets and plates	572	183	5,080	1,717
Cotton ties	1,938	.....	4,264	105
Tin plates	1,173	5,224	81,256	63,533
Wire rods	1,249	1,478	14,267	9,777
Wire	394	158	2,740	1,564
	14 263	8,899	183,501	95,455

Cheap Lake Superior ores and the wasting war in Cuba have curtailed importations of iron ore in the East this year. To the end of August 349,602 tons had come from all outside sources of supply, as against 547,267, or 200,000 tons more in the like period in 1896.

H. T. STROUSE has established headquarters at 79 Conestoga Building, Pittsburg, and will handle a full line of black plate mill and tin house supplies, representing some of the leading houses in this direction. The line will include black plate mills and chill rolls, shears of all descriptions, pickling, tinning, branning, and dusting machinery, pyrometers, packing boxes, etc.

THE P. L. Kimberly Co., of Sharon, Pa., has been organized to operate the Kimberly plants at Sharon and Greenville. The parties interested are P. L. Kimberly, G. A. Baird, R. L. Henderson and W. S. Roberts, of Sharon, and Alex. Thompson, of New Castle. Application for a charter will be made Nov. 9.

A DISPATCH from Ft. Wayne, Ind., says that arrangements have been made to consolidate the interests of John H. Bass at Ft. Wayne, Chicago, St. Louis, Rock Run, Ala., and Lenore, Tenn., into one corporation, with a capital stock of $2,000,000, and that all the plants will be started at once at their full capacity.

TRAINS will run regularly on the new portion of the Pittsburg, Bessemer & Lake Erie Ry. on Friday of this week. The road was formally declared open Oct. 4, but delays in bridge work along the line forbade the running of ore trains until now.

WESTERN FOUNDRYMEN AT CINCINNATI.

(Special Correspondence.)

CINCINNATI, O., Oct. 19.—The fall meeting of the Western Foundrymen's Association opened auspiciously Monday forenoon in the convention hall of the Grand Hotel. About 100 names were on the association register Monday night, and this is being increased by later arrivals, particularly from near-by cities. The contingent from Chicago, Milwaukee and other points in the Northwest came down in a special car Saturday night, the party including President Sercomb, Secretary Sorge and Messrs. W. N. Moore and S. T. Johnston, of the board of directors. The local committee of arrangements was promptly in evidence this morning and its attentions to the visitors have been constant and cordial. The badges are neat affairs of pink and light blue ribbon, with a pendant medallion bearing the monogram "W. F. A."

Monday morning's meeting was called to order by Geo. McG. Morris, of the John B. Morris Foundry Co., chairman of the committee of arrangements, who introduced Congressman Jacob H. Bramwell, of the Second Ohio District. Mr. Bramwell in a happy vein, introducing some of the vernacular of the foundry, welcomed the visitors as the representative of the Mayor of Cincinnati, who could not be present. President Sercomb responded for the association, telling the Cincinnati people some of the characteristics of the foundrymen who had come among them for a few days, and commenting on the vast advance that had been made in foundry practice in recent years.

In response to invitations read, the association decided to visit the Chamber of Commerce at 1 o'clock in the afternoon, and to go to the foundry supply works of the S. Obermayer Co. on Tuesday afternoon. Other invitations came from the John B. Morris Foundry Co., the J. A. Fay & Egan Co., the Davis & Egan Machine Tool Co., and the Cincinnati Milling Machine Co.

On motion of Mr. Moore, the secretary was asked to communicate with foundrymen in the Central and Western districts and ascertain the condition of business—whether any improvement had been noticed and to what extent foundries in these districts are running with fuller force than in the past two or three years. An amendment carried, providing for a committee to start the inquiry as to an improved condition of the foundry business, among foundrymen in attendance at this meeting, this information to be extended later by letter inquiry from the secretary's office. The committee was made to consist of W. N. Moore, of Joliet, Ill.; F. M. Lyon, of Aurora, Ill., and Geo. M. Sargent, of Chicago.

Wm. H. Pfaehler, of the Abram Cox Stove Co., Philadelphia, who is in Cincinnati to meet a number of Western foundrymen interested in the formation of a defense association, was asked to address the meeting. He spoke of the extension of American trade in foreign markets as the greatest desideratum of the manufacturer to-day. Inquiries from foreign parts are steadily increasing and the efforts of the National Association of Manufacturers are being rewarded with gratifying success. As to the sharp competition which foundrymen find in all parts of the country, he considered that the chief cause of demoralization was the effort of manufacturers in one district to unload surplus product in distant fields, and the retaliatory policy of those whose territory they invaded. He thought the tendency of foundrymen's meetings was to educate foundrymen to cultivate their near-by markets, to inform them more perfectly as to the state of trade and to prevent the demoralization that came from the predatory policy referred to.

Martin A. Fox, president of the Iron Molders' Union of North America, was called out. He said that while he might be regarded by some as an interloper, his visit was in the interest of all concerned in any way in foundry operations. He urged friendly relations between foundry employers and employes.

C. S. Bell, of Hillsboro, O., a vice-president of the American Foundrymen's Association, commended to Cincinnati foundrymen the benefits of organization.

At the Monday afternoon session a paper was read by S. S. Knight, of the Addyston Pipe & Steel Co., Addyston, O., on "The Value of Physical Tests." Its discussion occupied the afternoon. This paper and others will be given in full in next week's issue of the *Iron Trade Review*.

On Monday evening, convention attendants went to Pike's Opera House on invitation of their Cincinnati entertainers.

Tuesday morning's session was given up to the reading and discussion of a paper by Thos. D. West on "The Comparative Fusibility of Foundry Metals." In the afternoon the association went on a trolley ride about Cincinnati and its suburbs, and to night is enjoying the hospitality of local foundrymen and supply men at dinner.

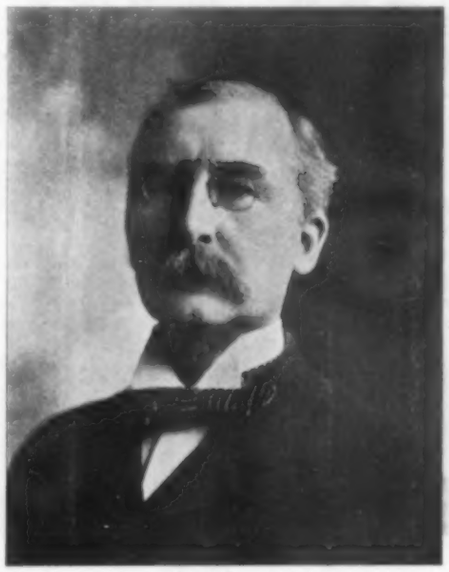
Wednesday's program includes D. H. Truesdale's paper on "Molding Sand," and in the afternoon a visit to the foundry of the Niles Tool Works Co., at Hamilton, O.

Ten new members were elected at Monday's session.

MANAGER OF CARNEGIE MINES.

No more capable manager could have been chosen, nor one of larger experience in Lake Superior iron mining, than Dr. Nelson P. Hulst, of Milwaukee, who has been selected to have general charge of the mining properties of the Carnegie-Oliver interests. For 10 years Dr. Hulst has been manager of the Pewabic Co. and for more than 20 years he has had an intimate acquaintance with Lake Superior iron mines, the Menominee range being more especially his field of operations.

Dr. Hulst took the regular literary course at Yale, graduating in 1867. He took his engineering degree from the Sheffield Scientific School two years later, and in 1870 he received the degree of doctor of philosophy. He entered the employ of the Milwaukee Iron Co. in September, 1870, as engineer and chemist and as examiner of iron ore and mineral lands. He continued with that corporation until its failure in 1875. In 1872, in this connection, Dr. Hulst first became acquainted with the iron country of Northern Michigan, making a thorough reconnoisance of the Menominee range, and conducting immediately thereafter a protracted and successful exploration of it. In 1876 he became located on the Menominee range as general superintendent and one of the stockholders of the



DR. NELSON P. HULST.

Menominee Mining Co., in which capacity he opened and managed its East Vulcan, Vulcan, Norway, Cyclops, Quinnesec, Chapin and Florence mines. Ill health from overwork compelled his resignation in 1882, but five years later he resumed mining work, becoming manager of the Pewabic Co., which succeeded to the extensive mineral land interests of the Menominee Mining Co. Exploration under the direction of Dr. Hulst resulted in the discovery of the Pewabic mine, famous for its very low phosphorus ore. Upon the organization of the Lake Superior Mining Institute, in 1892, D. Hulst was elected its president. He is broad-minded, eminently practical, and thoroughly conversant with iron mining, not only in its geological and engineering phases, but on its commercial side. His connection with the great properties whose product is to play so important a part in American steel manufacture in the next decade indicates that their development and working will be dictated by a liberal and well-considered policy.

AUTOMATIC RIM-DRILLING MACHINE.

One of the most recent types of machine designed to drill bicycle rims is shown in the two accompanying half-tone illustrations. Exactness of adjustment and ability to run at high speed are the chief requisites of tools offered for such service. These essentials and others, of which mention is made below, are believed by the makers to be attained in the rim-drill shown, which is manufactured by the Fox Machine Co., of Grand Rapids, Mich., the company employing it in connection with the manufacture of its own bicycles.

Fig. 1, which gives a side view, shows that the rim is held in place by the arms of a chuck, these being self-centering, moving in or out to hold or release the rim. There are two spindles for drilling and countersinking the spoke holes, while the third, in the center, is used to drill the valve hole. These spindles are set at any angle so that a line through their center would cross and come tangent with the hub at the point at which the spoke is attached. Provision is made for easy adjustment of the spindles for the different spacing required for varying numbers of holes and varying diameters of hub. After the rim is placed in position the valve spindle is drawn down, the valve hole drilled and countersunk, then the foot lever at the base of the machine is pressed, which throws into engagement the worm in the base of the machine.

Power is communicated to the machine through the countershaft at the rear, which is carried by a heavy bracket. The belt running to the base communicates motion to the worm, which runs in an oil tank. Motion from this worm is communicated through the bevel gears and inclined shaft to the horizontal shaft in the top of the machine. This horizontal shaft carries cams that draw down the boring spindles, also operates eccentrics which release the friction, which revolves the chuck at the proper time, and oscillates the pendulum on which the chuck is suspended. As soon as the machine is started, the bottom of the pendulum swings in toward the machine, stopping at the proper position; the cams draw the drilling spindles down and the holes are drilled and countersunk at a uniform depth. When the spindles recede the chuck is swung out to the outer angle, at the same time revolves the position of one hole. The drilling spindles are brought down and perform the drilling as before, when they recede, the bottom of the chuck moving in towards the machine, and at the same time, the chuck being revolved the position of three holes. This is repeated until the full number of holes are drilled, when the machine stops automatically with the rim lying perpendicular to the spindles.

The indexing of the rim is accomplished through a friction clutch which is released by a stop pin at the proper moment. The mechanism for indexing, which receives power through the short belt shown, consists of ratchet wheels having various numbers of teeth corresponding to the required indexing. These are shown on the left in Fig. 2.

The adjustments necessary to change from one number of spokes to another can be made in 15 minutes. To do this simply requires setting the two outer spindles, adjusting the indexing mechanism and changing gears. The thrust of the drilling spindles is taken on a double row of steel balls, running in a hardened groove. Particular attention was given to this feature, with a view to securing the maximum speed and ease of running.

The rate of operation is one hole a second, and six seconds are required for drilling the valve hole and putting another rim on the chuck. Thus, it is found that 1,000 rims can be drilled in 10 hours. The same company is bringing out a machine for automatically inserting washers; and it is the expectation that one man can drill rims and attend to the insertion of washers while the drilling is in progress.

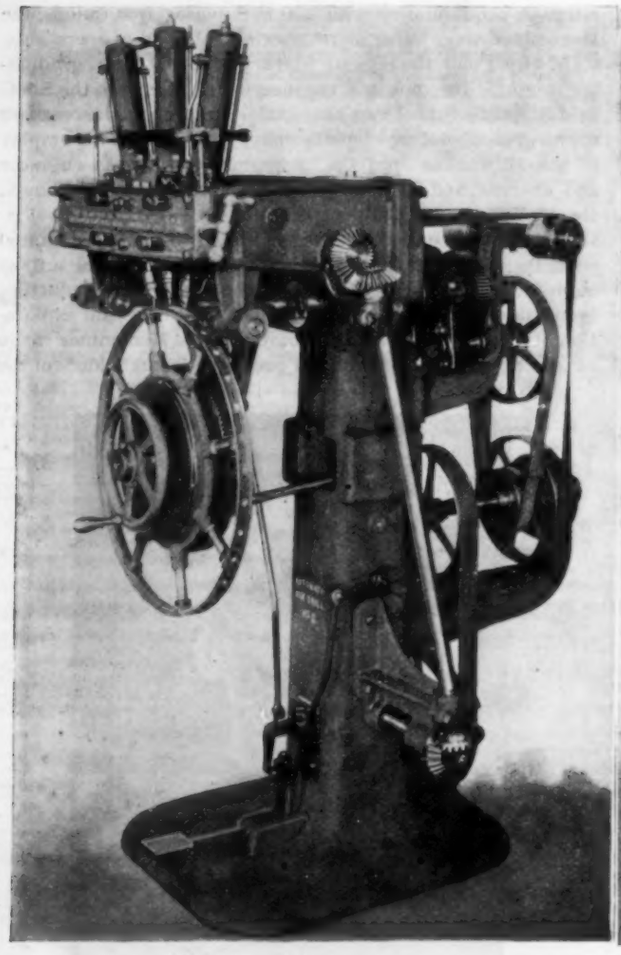


FIG. 1.

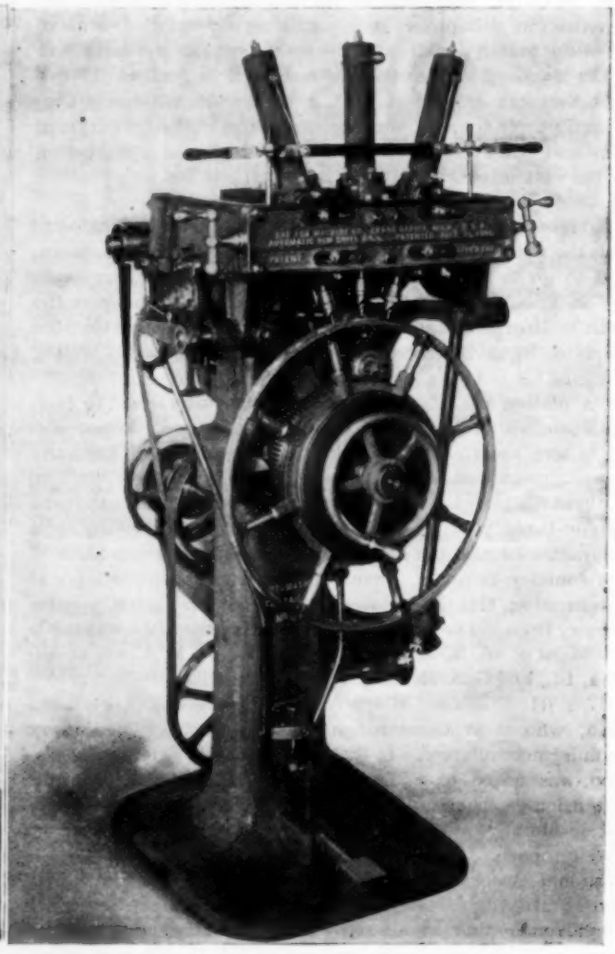


FIG. 2.

AUTOMATIC RIM-DRILLING MACHINE.

THE Davis & Egan Machine Tool Co., of Cincinnati, O. have been awarded a contract by the French Government for four heavy 36-inch standard engine lathes with 22-foot beds. The lathes are to be equipped with metric lead screw and full set of change gears for cutting a large range of threads of the metric pitch.

CONDENSED FROM THE TECHNICAL PRESS.

Brake Shoes.—[*Railroad Gazette*, Sept. 24.]—A contribution is made to the theory of brake shoes, from which the following is taken: It seems that there is a current impression that rough surfaces give greater friction than smooth ones, while in reality the mean co-efficient of friction of a smooth wheel surface in contact with the smooth surface of a composition shoe is higher than that given by cast iron. Experiments have also shown that by using either two smooth surfaces, or two rough ones, better braking effects are obtained than by using one surface smooth and the other rough. The effects produced can be studied best by assuming that the surface of the shoe and wheel are made up of a number of small projections, and as a consequence the physical characteristics of the metals come into play very strongly. Thus the soft cast iron brake shoe tends to produce a rough surface on chilled or steel tired wheels, and as the shoe itself also consists of rough brittle projections, the work must be done by either breaking off the projections, or riding over them. The larger the projections, the smaller the contact, and when the material is brittle, the greater is the tendency to break off the points. This is the case in the cast iron brake shoe. In the composition shoe, however, we find the reverse to hold true. The composition fills up the irregularities of a wheel surface so completely that it practically forms a coating on it. The projections on wheel and shoe are now so small and great in number, that very little breaking off takes place, but rather a riding of the projections one over another. In this case a higher mean coefficient of friction is obtained, and this consequently accounts for the greater wear obtained from composition shoes over those of plain cast iron. Experience has shown that ordinary cast iron shoes have a greater tendency to wear by grinding off the particles, than any of the other common metals. This is probably because cast iron is so brittle and does not heat sufficiently to flow. Soft composition brake shoes, on the other hand, do flow, and yet are not very much affected by breaking. Other materials often used for this purpose, such as soft steel, wrought iron, etc., depend, so far as their efficiency goes, to a large extent upon the temperature they attain during the operation. The question of the application of composition brake shoes with reference to changes in car construction is now taken up, a number of comparative tests discussed, and the conclusion reached that because of the smooth stop, and the uniform action of the soft composition brake shoe, as contrasted with the ordinary cast iron one so prone to start the skidding of the wheels, higher maximum coefficients of friction can be allowed without incurring the danger of skidding. M.

The Diffusion of Sulphide through Steel.—[*Engineering*, Sept. 10.]—Mr. E. D. Campbell of Ann Arbor describes a number of experiments made some time ago, which showed the rapidity with which sulphide of iron is diffused through steel when at a bright red heat. The purpose of these experiments was to decide whether a fixed chemical compound could diffuse through steel at such temperature. It had been known that carbon diffuses through steel under similar conditions, but whether a compound could do so was still to be determined. Steel bars were drilled at one end, and one of these filled with commercial sulphide of iron, the hole being afterwards plugged up with a piece of steel. The bar was then brought up to a bright red heat and kept so for four hours. On opening up afterwards the hole was found to be nearly empty, showing that the sulphide of iron had diffused through the steel; and as no appreciable increase in the sulphur contents could be detected, the sulphide evidently did not remain in the steel. A series of further experiments, some of which resulted in failures, brought out the fact that it was the oxysulphide of iron which could diffuse through the steel at high temperatures, and not the plain sulphide or subsulphide of iron. It would seem then that in the original experiment there must have been present in the commercial sulphide of iron used some oxide of iron, indeed the sulphur it contained ran only 20.62 per cent. In preparing oxysulphide of iron it was noted that when the oxides and sulphides of iron were melted together, that the reaction was very energetic and especially damaging to the crucible, a fact which was not noticed in the preparation of the other sulphides. To show that the sulphide diffused throughout the entire bar, portions of it were wrapped in asbestos which would absorb any fluid compounds which came its way. This proved to be the case, for the pieces of asbestos were found blackened and saturated with oxide of iron from the diffused oxysulphide. Experiments were now made with cuprous sulphide, which proved negative until the oxysulphide of iron was added, when diffusion took place, showing that the copper sulphide was taken along with the iron compound. It was further shown that no decomposition took place within the bar while the diffusion was going on. Nickel sulphide could be made to diffuse in a similar way, though but in very small proportions. The explanation of the above phenomena is given by the author as follows: The oxysulphide of iron being an extremely mobile liquid at the temperatures employed, it would be easily absorbed by a porous body. If steel is at all porous at these temperatures the oxysulphide would go through. One of the trials shows, further, that the diffusing material tends to accumulate at the lower end of the bar, showing the influence of gravity, as well as the fact that diffusion takes place as a liquid and not as a gas. Cuprous sulphide, normal iron sulphide, nickel sulphide, are evidently not mobile enough until diluted with oxysulphide of iron; even then in the case of nickel sulphide the particles cannot be divided finely enough to penetrate into the steel very far or in quantity. A number of experiments were finally made in which various oxysulphides of iron were produced, but the exact conditions, whether chemical or physical, which govern the formation of diffusing oxysulphide of iron have not as yet been determined, and the whole subject still awaits solution. M.

CONDITION OF BLAST FURNACES OF U. S.*

Oct. 1, 1897.

Location of Furnaces.	Coke and Anthracite.					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	18	4	4953	14	7487	5	1	84	4	468
New Jersey	5	2	1843	3	1327	.....	.....	.....	.....	.....
Spiegel	3	2	454	1	100	.....	.....	.....	.....	.....
Pennsylvania:						13	1	50	12	695
Lehigh Valley	37	8	4811	29	12869	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	70	.....	.....	.....	.....	.....
Schuylkill Valley	18	5	3228	13	7728	.....	.....	.....	.....	.....
Upper Susqu. Val.	5	2	1804	3	1780	.....	.....	.....	.....	.....
Lower Susqu. Val.	9	3	3067	6	3393	.....	.....	.....	.....	.....
Spiegel	1	1	287	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	4	2845	8	4484	.....	.....	.....	.....	.....
Pittsburgh	28	24	52349	4	7162	.....	.....	.....	.....	.....
Spiegel	2	2	873	0	0	.....	.....	.....	.....	.....
Shenango Valley	17	10	15528	7	4357	.....	.....	.....	.....	.....
Jun. and Con. Vals.	15	5	6706	10	4976	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	750	.....	.....	.....	.....	.....
Youghiogheny Val.	3	1	1150	2	1900	.....	.....	.....	.....	.....
Miscellaneous	5	2	1851	3	1789	.....	.....	.....	.....	.....
Maryland	5	3	3874	2	1670	4	1	100	3	428
Wheeling District	9	5	6492	4	5123	.....	.....	.....	.....	.....
Ohio:						9	4	240	5	489
Mahoning Valley	11	9	14258	2	2190	.....	.....	.....	.....	.....
Central & Northern	11	8	11240	3	3048	.....	.....	.....	.....	.....
Hocking Valley	2	0	0	2	850	.....	.....	.....	.....	.....
Hanging Rock	12	4	1610	8	1854	.....	.....	.....	.....	.....
Indiana	2	0	0	2	406	.....	.....	.....	.....	.....
Illinois	16	12	23287	4	5200	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	1150	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	3	3097	1	770	3	0	0	3	1465
Missouri	2	0	0	2	740	1	1	375	0	0
Colorado	3	0	0	3	4620	.....	.....	.....	.....	.....
Virginia	23	8	5715	15	8265	4	0	0	4	437
Kentucky	6	2	638	4	2650	3	0	0	3	300
Alabama	39	17	19167	22	14300	12	1	259	11	2594
Michigan	.....	.....	.....	.....	.....	15	5	2424	10	3640
Tennessee	13	5	4265	8	4109	9	2	419	7	2200
Georgia	2	0	0	2	960	3	1	380	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	155	9	858
Texas	.....	.....	.....	.....	.....	4	1	150	3	790
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	275
Totals	343	151	195492	192	109218	98	20	4636	78	15074

SUMMARY.

Fuel.	In Blast.						Out of Blast.			
	Number.			Weekly Capacity.			Number.		Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.		Month Previous.
Charcoal	20	21	24	4,636	4,555	6,229	78	77	15,074	15,144
Coke and Anthracite	151	140	103	195,492	180,951	105,520	192	213	109,218	130,897
Total	171	161	129	200,128	185,506	111,749	270	290	224,292	146,041

*The above table is condensed from the *Iron Age*. The tables of the *American Manufacturer* show in blast Oct. 1, 171 furnaces, with 197,398 tons weekly capacity instead of 200,128 as above.

LAKE SUPERIOR IRON MINES.

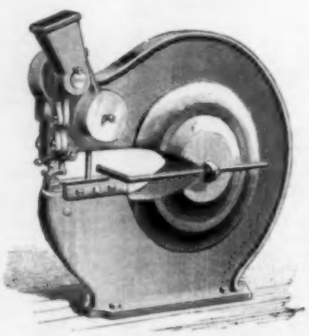
The Duluth & Iron Range Road will let contracts for important improvemntes to cost nearly $500,000. A new ore dock at Two Harbors, 1,200 feet in length is planned, and the laying of 18½ miles of track from Waldo to the Cloquet River. This new track will give easier grades and permit of hauling much heavier trains.

In addition to the options on the Pioneer mine which the Oliver Mining Co. has had for some time past, it is understood that one of the Cleveland-Cliffs Iron Co.'s mines at Ishpeming was looked over and negotiations started with a view to purchase. No agreement was reached, however, and it is not likely that the Pittsburg interests will make any further move for the present to enter the Marquette Range.

By the terms of the agreement reached between the Dunn Mining Co. and the fee-owners of the Dunn mine, the mining company is to carry on exploration work at the bottom of the mine, and to connect No. 1 and No. 2 shafts. The company will be permitted to take the ore which is in the pillars around No. 2 shaft. If enough ore is found in exploring, a new shaft will be sunk.

LEVER PUNCH FOR GENERAL SERVICE.

A lever punch especially adapted to sheet iron and boiler work, carriage and wagon shops and railing makers, has been brought out by Bertsch & Co., of Cambridge City, Ind. The lever works from the front or the back, and the stripper, or take-off, is placed behind the plunger, so arranged that all the light possible is afforded, it being easily possible to see a mark on the work. Holes can be punched near the edge of angle and flange iron and around the edge of a five-inch pipe or ring. The punch is provided with steel eccentric, steel plunger, steel eccentric yoke and box, three sets of quickly adjustable dies and punches, and back and side gauges for punching holes equi-distant without marking off. A half-inch hole can readily be punched in three-eighths iron,



as the eccentric has a short movement. There are 10 sizes ranging from four-inch to 24-inch throat. Special sizes are made for punching a half-inch hole in half-inch iron.

An adjustable steel die seat is provided, and the punch ram is also adjustable in the types of the machine now made, These features add to the life of the punch and decrease the liability to chipping and breaking. Any lost motion in the plunger bearing can be taken up and the die seat so adjusted that the punch will always enter the die centrally. These provisions, with reasonable care, ensure a long term of service.

Important Combination Projected at New Castle.

In connection with the announcement of the plans of the Shenango Tin Plate Co., which is to erect a 30-mill plant at New Castle, it was stated that the stockholders were all interested in other New Castle iron and steel enterprises, some of them in several. It is now stated that steps are being taken looking to the amalgamation of these kindred companies in one organization. The proposed combination would take in the Shenango Valley Steel Co., which owns the Neshannock Furnace and the Bessemer steel plant, and is adding a bar mill; the New Castle Steel & Tin Plate Co., with its 18 hot mills and an annual capacity of 35,000 gross tons; the New Castle Wire Nail Co., whose mills have a capacity of 60,000 gross tons of rods, 54,000 tons of wire and 1,000,000 kegs of nails a year, besides the new Shenago Tin Plate Co. It is stated that should the combination be effected the new company would employ 5,000 hands, with pay rolls of $3,000,000 a year, and have an output of 110,000 tons of pig iron, 300,000 tons of steel billets, and 2,000,000 boxes of tin plates, in addition to the output of wire rods and wire and nails named above. Negotiations are well along, with good prospects of being consummated.

American Rails for New South Wales.

The government of New South Wales has placed orders for 2,000 tons of 60-lb. and 2,000 tons of 80-lb. T-rails in this country through the Australian commission houses of Henry W. Peabody and R. W. Cameron & Co., respectively. The former order was secured by the Lackawanna Iron & Steel Co., of Scranton, Pa., and the latter by the Maryland Steel Co., of Sparrows Point. It is probable that additional orders will follow, as the government engineers are favorably inclined to the methods of American manufacture and report that the wearing qualities of American rails are superior to English. The price also is lower, and American mills arrange for price and delivery where the rails are wanted, whereas the English makes are not willing to go to this trouble, but will only name prices at the mills.

Large orders for girder rails could be secured if the American makers will arrange to roll the "lip" from the first pass rather than turn it up in the last two or three. This is required by the New South Wales government because the groove cannot exceed seven-eighths inch, and the rear on the lip is thereby increased. This method of manufacture requires a universal rail mill, of which there are one or two in Germany, but none in this country. Several orders in the past have been placed in England under these conditions, but this special feature of manufacture has been omitted. Whereas the manufacturers here probably could not furnish rails under such conditions, they could secure orders on the specified process, and a universal mill would be a good investment for some of our manufacturers, as the process of rolling the lip from commencement of rolling adds to the life of the rail, and is superior to the present method of turning it up.—[Railroad Gazette.

THE control of the J. I. Case Threshing Machine Co., of Racine, Wis., has passed into the hands of a new group of capitalists. It is understood that the purchase price was $2,000,000, cash. The old officers of the company resigned, and a meeting of the stockholders was held, at which the following were elected directors: John T. Fisk, Frank G. Bigelow, H. A. J. Upham, Frank K. Bull, Chas. E. McIntosh, Frederick Robinson and R. T. Robinson. Officers were elected as follows: President, Frank K. Bull; vice-president, Frederick Robinson; Treasurer, Charles E. McIntosh; secretary, Richard T. Robinson.

A CHARTER has been issued to the A. T. Stewart Co., of Pittsburg, for the manufacture of agricultural implements; capital $5,000. The directors are Alexander T. Stewart, Pittsburg; George W. Friedel, Greensburg; Levi A. Hultz, West Newton; John R. Helmolds, Saxonburg, and Wilbur H. Tudor, St. Clairsville, O.

THE Shenango Valley Steel Co., New Castle, Pa., granted an advance in wages last Saturday to laborers, restoring the 15 per cent cut made when the mill resumed work some weeks ago.

AN electric plant will be added to the Shenango Valley Steel Co.'s plant at New Castle, which will furnish light for the entire plant and will also possibly assist in the operation of the machinery.

THE Charles Munson Belting Co., of Chicago, have purchased property in Allegheny and will remove their plant as soon as repairs have been made to the property secured.

THE drought is causing temporary inconvenience in coke and many ovens were banked this week for want of water.

THOMAS DEEGAN, secretary of the Keystone Axle Co., of Beaver Falls, died on Monday of this week.

THE West & McLean Fire Brick Co., of Allegheny has been organized and a plant will be erected.

THE SEDERHOLM BOILER.

Fraser & Chalmers, of Chicago, have recently built quite a number of boilers of the Sederholm type, views of which are given herewith. A 240-h. p. boiler is shown in the cuts and five of these are now under construction. These are intended to work under 125 lbs. pressure. Others are designed for pressures up to 180 lbs. and of capacities up to 350 h. p. The feature that will be first noticed is the arrangement by which the furnace drums protect the main shell from the direct action of the fire. The furnace drums being made of thin metal readily take up the direct heat of the furnace; while their seams are all away from the fire.

The circulation is from the center of each of the furnace drums outward toward each end, carrying sediment to a point at which it is out of harm's way. The circulation is also upward through the bent side tubes and downward in the middle of the main boiler. This rapid circulation insures steaming surfaces free from steam bubbles.

Easy cleaning is another point that has been aimed at successfully. Each furnace drum has a man-hole of standard size, and the drums being of such diameter that a man can conveniently work in them, freedom from scale is possible. In the main boiler is a man-hole underneath the tubes and one above them, so that it can be kept free from scale and mud. Provision is made for free sweep of flame, opportunity being given for the flame to develop before it is burned out. This advantage is emphasized where soft coal is employed.

Attention is called to the small amount of brick work required for these boilers and to the fact that it is so disposed as to be free from strains. The main walls are but five to six feet high. Comparatively small floor space is required as can be seen and there is the advantage of simplification in piping flue arrangements, etc., due to the fact that the boiler can be built in large units.

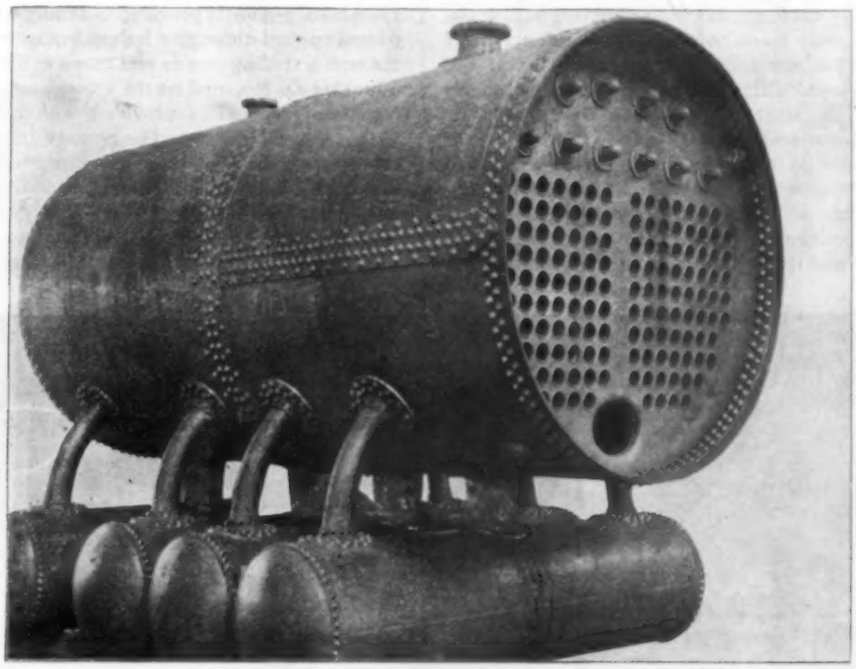


FIG. 1.—SEDERHOLM BOILER. MAIN SHELL WITH FURNACE DRUMS.

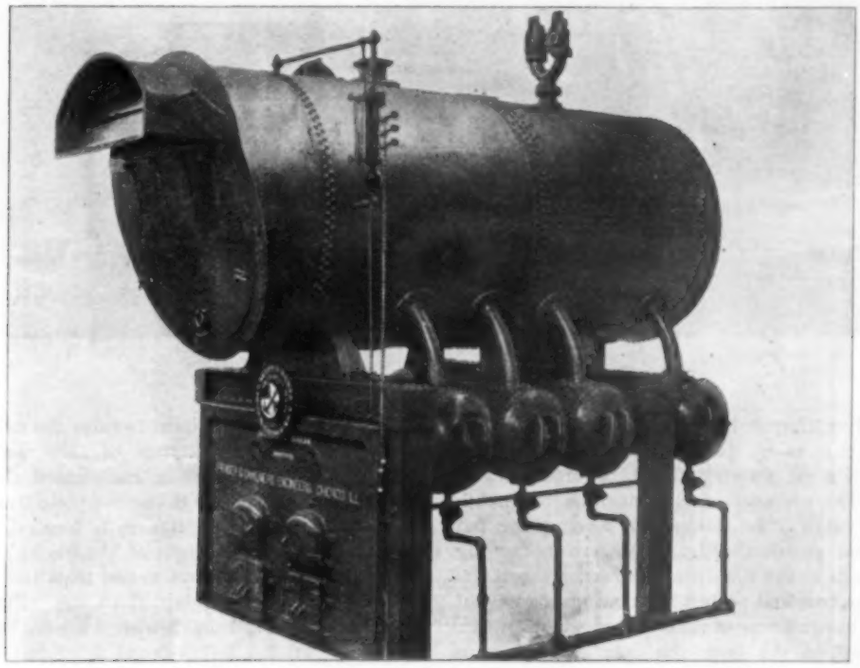


FIG. 2.—SEDERHOLM BOILER, SET UP READY FOR BRICK WORK.

THE gray iron foundry at the Warder, Bushnell & Glessner Co.'s shops, Springfield, O., has started up with 100 men.

THE ANDREWS & HITCHCOCK CO., Youngstown, O., expects to blow in its No. 2 furnace Nov. 1.

THE MURRAY MOLDING MACHINE.

Gradually the molding machine is making its way into the foundry in various forms. The early types operated by hand, and designed for small work, did nothing but draw the patterns; but steadily the range of service has been extended and the efficiency of the machine increased until to-day every well-equipped shop that is prepared to compete against all comers, particularly on specialties, employs machine molding to a greater or less extent. Often the cost of special patterns for use upon the machines, particularly where the patterns were being constantly changed, has been regarded as a drawback, and more and more machine construction adapts itself to the use of patterns of any design without extra cost.

The apparatus shown in the illustrations was devised by Joseph B. Ramp, of the Murray Iron Works, Burlington, Ia., and it was designed particularly with a view to the use of any pattern that would go in the flask and also to permit the use of flasks of any depth. If the patterns are split nothing is required but the use of the plate shown in Fig. 2. This plate is made to fit both cope and drag and has drawn across it from side to side and from top to bottom lines intersecting at right angles and cutting it into squares. Thus one-half the pattern can be set so many spaces from one side, in making the drag, and the same number from the other side in making the cope. The pressure of the machine is directly from above, so that there is no danger in moving the pattern from its original position. Fig. 2 shows a boiler lug, which was being made at the time the view was taken, and it was remarked how true and perfect the castings came out. When patterns are irregular or of any design requiring the use of a follow-board on the floor, the only extra cost involved is the expense of an additional follow-board on which to ram up the copes—just the reverse of the one used with the drag.

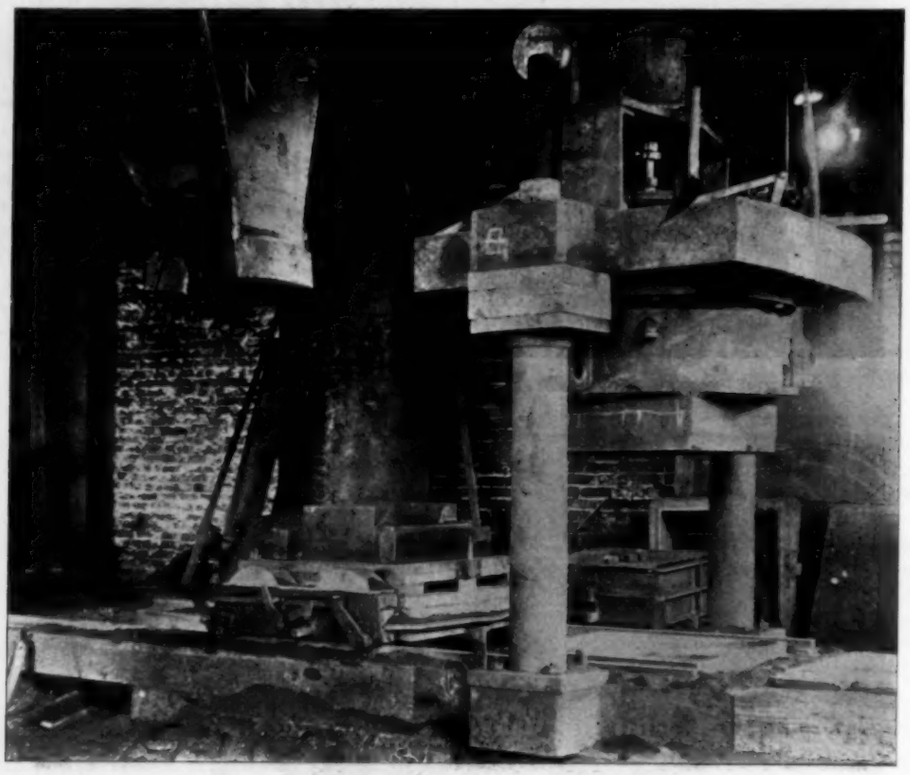


FIG. 1.—MURRAY MOLDING MACHINE IN USE.

Fig. 1 is a view of the machine as in actual operation. The follow-board is of the type referred to, having on it a pattern for a railroad truck-end. The casting originally cost 36 cents on the floor. On the machine it costs 17 cents. These castings are produced at the rate of 3,000 to 4,000 a year and constitute but one class of a number that are now regularly made on the machine.

Fig. 3 is an outline elevation of the machine, which indicates its construction. Fig. 4 is a view of a portion of the apparatus partly in side elevation and partly in section. A is the bed plate on which standards are located supporting the cross-head B. The cylindrical piston 9 is provided on its lower end with a plunger 10, and the piston normally encloses the head 5. The supply of pressure to move the piston 9 can be controlled by means of a valve 13 in the pipe 11, and exhaust is permitted through 14. That the apparatus may be operated by two attendants standing at opposite sides of the machine, the stem of the valve 13 is provided with a cross bar 15 to the respective ends of which rods 16 and 17 are connected. The other ends of the rods are connected with hand levers 18 and 19 located at the sides of the apparatus. The cylindrical piston is provided centrally with a rod 20, which passes upward through a hub 21 in the center of the head 5, through a stuffing box 22 and into a cylinder 23, supported on a bracket 24, mounted on the cross head, and the upper extremity of the rod is provided with a piston 25, operating within the cylinder 23. The areas of the cylinder 23 and piston 25 are considerably less than of the piston 9 and head 5, and the cylinder 23 is in constant and direct communication with the source of power.

In the drawing a pipe 26 conducts the pressure from the pipe 11 to the cylinder 23. The pressure exerted under the piston 25 will be sufficient to raise the cylindrical piston and its plunger 10. It will thus be seen that the piston 9 and plunger 10 are normally maintained elevated, by pressure under the piston 25. On the bed-plate tracks 28 are mounted, and between them a plate 29 is located, its thickness being about equal to the height of the tracks. The bed-plate A is also provided with stops 30 and trips 31. On the tracks 28 two carriages like C are adapted to run. Each carriage is constructed of metal and its wheels are enclosed by guards.

In operation a follow-board is placed on the plate of the car on eccentrics and sustained by the latter in its highest position, at which time the levers 36 attached to the eccentrics will be inclined away from the operator. The flask is now placed upon the follow-board and the sand is placed upon the pattern in the usual way and, if desired, a board of equal size with the internal capacity of the flask may be placed upon top of the sand. The carriage is now run by the operator under the press. The lug 41 will strike the stop-pin 30 and bring the carriage to a full stop, the hooked end of the locking lever also engaging the other side of the stop, and the carriage will thus be held from movement in either direction. One of the rear levers 36 (or a pin *a* thereon) strikes the trip 31, which causes the levers 36 to assume vertical positions, as

shown in Fig. 3, and the eccentrics 34 partly to revolve, bringing their short radii up under the car plate, thus allowing the latter to rest upon the plate 29 (Fig. 4), and free from any pressure upon the carriage. One of the operators will then open the valve 13 and admit pressure to the cylindrical piston and cause the latter and the plunger 10 to descend upon the sand, or the plate, in case one is used. The sand is thus thoroughly pressed upon every part of the pattern, with a uniform amount of pressure. The operator then shuts off the pressure to the cylindrical piston and the piston 25 will at once rise, carrying with it the cylindrical piston and its plunger 10. The operator will then pull a cross-bar toward himself, reversing the eccentrics, raising the plate and follow-board, and releasing the automatic catch or locking-lever. The carriage is then pulled out and the pattern removed in the ordinary way; the attendant at the opposite side of the apparatus will run his carriage under the press and repeat the same operations.

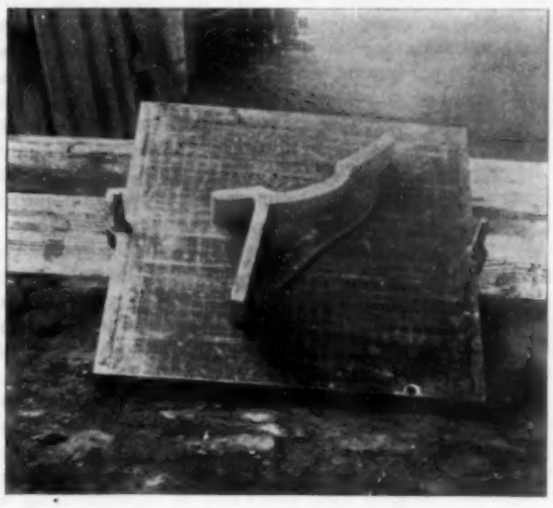


FIG. 2.—PLATE FOR SETTING PATTERNS

The machine is built by the Murray Iron Works in any size desired, and to take any depth of flask. Copes and drags may even be of different depth to save excessive use of sand, with no change other than making up the difference in extra thickness on the follow-boards. With two trucks in operation, it is estimated that 150 flasks a day can be readily turned out. The machine may be operated by steam pressure, but steam has its disadvantages. The design is—and this has been the practice at the Murray Iron Works the past year—to use compressed air, applications of which are more and more a necessary adjunct of foundry operations. It requires three or four horse-power to supply the machine and an air hoist with air.

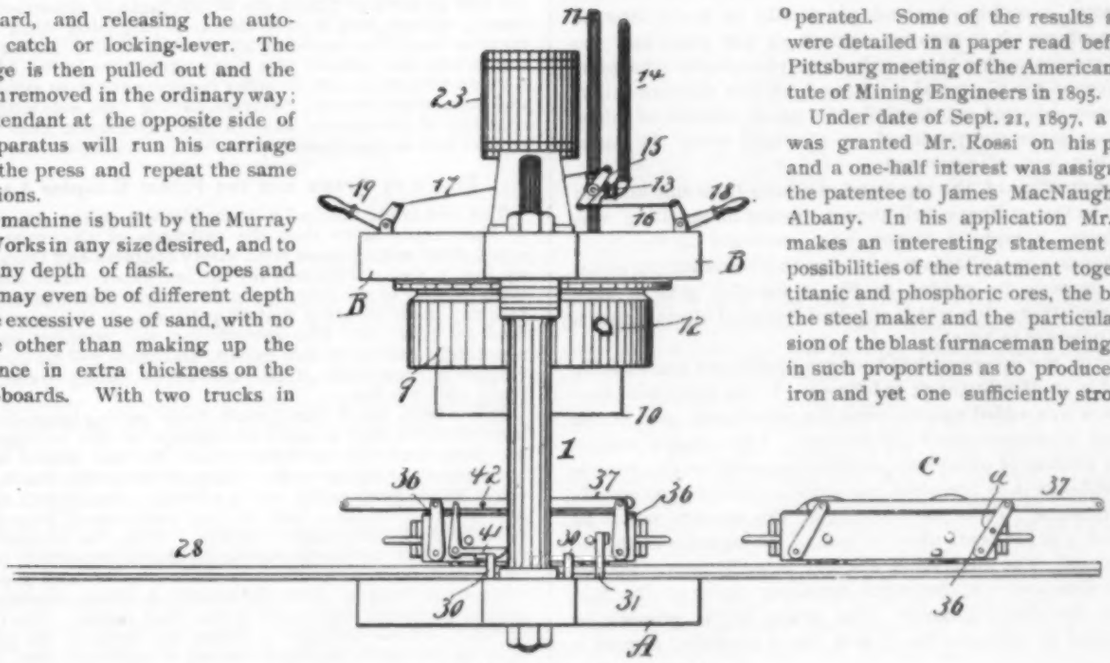


FIG. 3.—ELEVATION OF MACHINE.

THE main office of the Pittsburg Reduction Co. has been moved from Pittsburg to New Kensington, Pa., where the aluminum works of the company are located.

THE foundation walls are being constructed for a new foundry at the Card Electric Works, Mansfield, O. The new structure will be 100 x 40 feet.

PROCESS OF TREATING PHOSPHORIC IRON.

For several years experiments in the smelting of titaniferous ores have been conducted by Mr. A. J. Rossi, of New York, and papers giving the results of his research have been presented at meetings of the American Institute of Mining Engineers. Mr. Rossi's experiments were conducted in part at Buffalo, where a furnace of three tons daily capacity was operated. Some of the results secured were detailed in a paper read before the Pittsburg meeting of the American Institute of Mining Engineers in 1895.

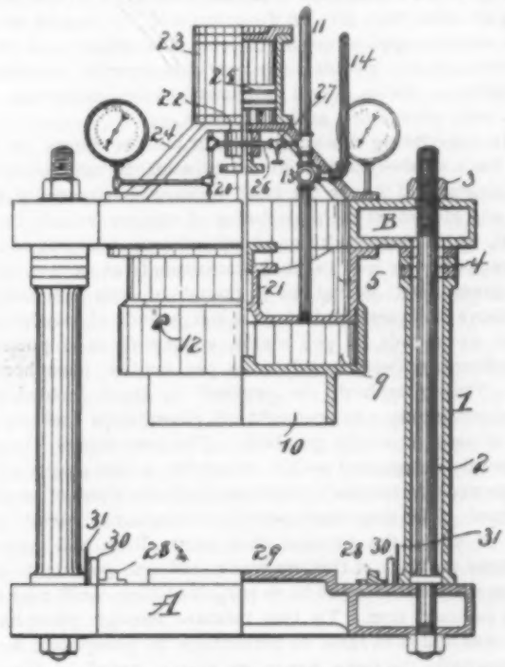


FIG. 4.—PART SIDE ELEVATION AND PART SECTION.

Under date of Sept. 21, 1897, a patent was granted Mr. Rossi on his process, and a one-half interest was assigned by the patentee to James MacNaughton, of Albany. In his application Mr. Rossi makes an interesting statement of the possibilities of the treatment together of titanic and phosphoric ores, the bane of the steel maker and the particular aversion of the blast furnaceman being united in such proportions as to produce a fluid iron and yet one sufficiently strong for foundry purposes. We quote the following in which the process and the inventor's claims are set forth:

"Titanic ores may be said to be almost invariably Bessemer ores, containing rarely more than a mere trace of phosphorus, and this is particulary the case when these ores are high in titanic acid, containing, say, 10 to 20 per cent thereof, and these titanic ores when smelted yield, as is generally conceded, a pig metal particularly strong and tough, though nearly white, and containing most of the carbon in the combined state.

"My invention relates to the redemption of hitherto substantially useless phosphoric iron ores, [those containing from 0.50 per cent to 1.00 per cent of phosphorus] and the object is to economically treat such ores so as to counteract the effect of the phosphorus in the pig metal smelted from them and

increase its strength and toughness. I attain these objects by mixing in proper proportions with phosphoric ore or phosphoric pig derived therefrom titaniferous ore containing from, say, five per cent to 20 per cent or more of titanic acid, whereby the weakening influence of the phosphorus is counteracted or at least so diminished as to render the resultant mixure fit for most foundry purposes. To convey all the knowledge requisite for the application of my improvement it is necessary to do no more than give an illustration of the way in which I have actually applied my invention. The analyses of the ore employed in this instance was per 100 pounds, substantially as follows: Silica, eight; alumina, three; magnesia, one; lime, two; phosphoric acid, 1.84; iron, 59.

"In considering this application it will be borne in mind that the 1.84 phosphoric acid corresponds to 0.80 pounds of phosphorus and that in the blast furnace substantially all the iron and almost all the phosphorus of the ore go into the pig metal, which, besides iron and phosphorus, contains some six per cent more or less, of such constituents as carbon, silicon, manganese, etc., so that the 59 pounds of iron mentioned in the above analyses as yielded by 100 pounds of ore furnished about 63 pounds of pig metal, containing 0.80 pounds of phosphorus, or very nearly 1.27 per cent of phosphorus, or less. This phosphoric ore, smelted by itself, yielded a pig metal containing 1.125 per cent of phosphorus and 3.17 per cent of carbon, mostly graphitic. The iron was of the grade frequently designated as No. 2 foundry, a fair quality of iron, but so weak as to break under two or three blows of a sledge-hammer. The slag accompanying it contained about 43 per cent of silica, the balance in alumina, lime, and magnesia. To three portions of this ore was mixed one portion of titaniferous ore containing 18 to 20 per cent titanic acid and about 57.90 per cent iron. To this mixture enough phosphate of lime was added to raise its percentage in phosphoric acid to substantially the same figure as above stated in the phosphoric ore—viz., 1.84 per cent—the titanic ore in this instance containing, as will be observed, practically as much iron as the phosphoric (57.90 per cent against 59 per cent) and the titanic ore containing traces only or no phosphorus whatever. Therefore in the pig metal resulting from this mixture might have been expected substantially the same amount of phosphorus as in the pig produced as aforesaid from the phosphoric ore—viz., 1.27 per cent.

"The analysis of the pig metal resulting from this mixture treated in the ordinary well-known process of smelting was as follows: Graphitic carbon, 3.34; combined carbon, 0.33; phosphorus, 1.229; titanium, 0.35; but this resultant pig metal might properly be graded as No. 1 foundry gray, a very tough and strong iron which required repeated blows from a sledge hammer to break.

"Again, my invention has been practically and successfully applied in another instance, as follows: To the aforesaid phosphoricore was added apatite until the phosphoric acid in the resultant mixture equaled 4.80 per cent. This unusual and excessive amount of phosphoric acid corresponded to 2.13 pounds of phosphorus in 63 pounds of pig metal yielded by 100 pounds of the mixture. From the smelting of this mixture was to be expected 3.36 per cent, more or less, of phosphorus in the resultant pig. The analysis of the pig actually gave 2.862 per cent of phosphorus in the metal, breaking easily at the first blow of the sledge-hammer. The grade might properly be designated as between No. 2 and No. 3 foundry, almost a No. 2.

"In the next instance two parts of the highly-phosphoric mixture were added to one part of titaniferous ore of the following composition: Silica, 1.53; titanic acid, 19.74; alumina, 3.50; lime, traces; magnesia, 1.50; oxide of iron, 73.62; phosphorus, none; metallic iron, 53.32, together with a sufficient amount of apatite to raise the percentage of phosphorus to be expected in the pig metal to 3.36 per cent or thereabout. This mixture was subjected simultaneously to the same smelting treatment as the highly-phosphoric mixture, the two mixtures being treated in large crucibles placed side by side in a furnace with forced blast and exposed to the same firing for the same length of time and the treatment in each case simultaneously terminated.

"In the case of the mixture with titaniferous ore the analysis of the resulting pig showed 3.229 per cent of phosphorus and of titanium 0.47 per cent. The grade of this pig might have been properly designated as No. 2 foundry. The iron was quite strong and it required several blows from a sledge hammer to break it. Its contained carbon was for the most part in the graphitic state, as in the case of the pig metal resulting from the merely phosphoric mixture aforesaid. The resultant slag analyzed in round numbers about as follows: Silica, 31; titanic acid, 14; alumina, 17; lime, 28; magnesia, 10. And it is interesting to bear in mind that this titaniferous ore, if smelted by itself, would have yielded an iron which, though characteristically tough and strong, would have been of the characteristic light steel-gray color and having nearly all its carbon in the combined state. Thus by my invention, applying titanic to the phosphoric ores, not only may the resulting iron be produced of a very fair foundry pig quality, but also of a grade properly designated as No. 2. And though in the instance in which one-third of titanic ore was added to the phosphoric ore the resulting metal lost one grade, being No. 2 instead of No. 1, as in the case where only one-quarter of titaniferous ore was added to the mixture, nevertheless the resultant metal contained by far the greatest quantity of its carbon, as stated in the graphitic state. Thus the effect of my mixture is not only to improve the resultant pig iron by counteracting the weakening effect of the phosphorus by the characteristic influence of the titanium on the iron, but also the phosphorus itself operates to influence the state in which is found the carbon contained in the metal, whereby such carbon is caused to exist in the iron in the graphitic state even in cases where so much as one-third of titaniferous ore is added to the mixture.

"The foregoing instances demonstrate that even in cases where the excessive amount of three per cent of phosphorus is found in the resultant pig metal the action of the titanic admixture is so beneficial as to secure a satisfactory and vastly stronger and tougher iron, and I find in experimenting with other proportions of the two classes of ores referred to—for instance, with 20 parts of titanic ore to 80 parts of phosphoric ore and 40 parts of titanic ore to 60 parts of phosphoric ore, among others—that in each case it is easy after such experiment as would be made by any person skilled in the art to proportion the quantity of a given titanic ore to be added to a given phosphoric ore in order to secure the most satisfactory and economical results, analyses having first established the quantity of phosphoric acid in the phosphoric ores and of titanic acid in the titaniferous ores."

The Iron Trade and the Patent Coupler Law.

The iron trade has had a lively interest in the enforcement of the requirement that the railroads of the country shall equip their rolling stock with safety couplers and train brakes by Jan. 1, 1898. Petitions for further extension of time have been coming to the Inter-State Commerce Commission, which recently made an order that all petitions of this sort shall be filed by Nov. 15. The commission will consider each case separately and on its own merits, and there will be no general extension regardless of the reason for failing to comply entirely with the law.

It has been found that certain roads paying large dividends have reported only a small percentage of cars equipped, and are petitioners for an extension of the time within which to complete their equipments. Some of the poorer roads, on the other hand, have made every effort to comply with the law, and will require but a little further extension of time in order to make their compliance complete. Thus, the Southern Pacific, which has not been paying dividends, reports 69 per cent of its cars equipped with automatic couplers and 96 per cent with train brakes. The Baltimore & Ohio reports 80 per cent of perfected equipment under both heads. The Chicago & Alton, whose petition is made the basis of the proposed hearing, has been paying dividends of eight per cent, and yet reports less than 38 per cent of its 6,599 cars equipped with safety couplers and only 17½ per cent with train brakes. Extensions will be difficult to obtain in cases where the percentage of equipment runs so low under such a favorable financial condition of the roads. The Baltimore & Ohio expects to have four-fifths of its 33,231 cars fully equipped on Jan. 1. The Central Railroad of New Jersey, with its 10,928 cars, shows 58 per cent equipped with safety couplers and 20 per cent with train brakes. The Pennsylvania, with 64,275 cars, reports 58 per cent supplied with automatic couplers and 48 per cent with train brakes. The Philadelphia & Reading, with 25,100 cars, expects to have 91 per cent equipped in regard to couplers, but only 20½ per cent in regard to brakes. The Pennsylvania lines west of Pittsburg have 52,453 cars, of which 67.9 per cent will be equipped with automatic couplers and 37.7 per cent with train brakes. The Rock Island road will have 68 per cent of its 16,388 cars properly equipped with couplers and 42 per cent with brakes.

It would appear, in general, that the iron trade has a considerable business yet coming to it on account of the safety equipment law.

UTILIZING COKE-OVEN GASES.

In the belief that the manufacture of the by-products of retort coke ovens may be overdone, and that prices will gradually seek lower levels, German iron and steel firms having their own coking plants are turning their attention to additional economies in connection with coke-making. Much study has been given of late to the saving resulting from the use of coke-oven gases under boilers, for the purpose of furnishing power for finishing mill plants that are close enough to make this practicable. Blast furnaces, of course, take care of all the steam plant needed in connection with them, and therefore connections with rolling mills and steel works must be looked to to take the gases that pass from the by-product works. It does not often happen that arrangements can be made with municipalities for the piping of these gases for street and house lighting.

What has been done at a bee-hive plant in this country is indicated in the report of Mr. A. H. Wood, Commissioner of Labor and Inspector of Mines of Tennessee, for 1896. It gives a description of an arrangement for using coke-oven gases to fire boilers and make steam, which is in use at the mines near Tracy City. A plant of this kind was put up at Victoria, Tenn., as long ago as 1876, but it was not a success. Several plans were tried at Tracy City, and finally the present plant was built in 1891. Some changes have since been made in it, and it is now operating in a very satisfactory way. The whole arrangement is shown in the accompanying engravings, Fig. 1 being a section of the ovens; Fig. 2 and Fig. 3 sections of the boilers.

The ovens are ordinary beehive, 10 to 11 ft. in diameter, built of fire-brick and sandstone. There are 34 in the block, 17 on a side, and placed back to back, not staggered. The flue was accordingly built with little interference with the oven walls. It is of fire-brick with fire-clay joints, having an area of 12 square feet, with arched top, and the opening into each oven is above the springing line, and is 12 inches round; this flue is rather smaller than it should be for so many ovens. After leaving the ovens, the flue is carried about 75 feet to the boilers; just before reaching them it is split in two so as to distribute the gas evenly in front of all three boilers. The current is kept under entire control by a damper just outside the boiler house, constructed of boiler-plate and channel iron, in which a stream of cold water constantly circulates, and by lids placed over the eyes of the ovens. Thus, while the boilers are in use, the damper is raised and the ovens covered, forcing the gas through the flue; at night, or when not in use, the damper is lowered, and the lids are removed from the ovens. The ovens are charged with five tons of washed slack, and the coke yield is from 57 to 59 per cent. The present battery includes three flue boilers, 40 inches in diameter, by 24 feet long. Several different arrangements of boiler settings have been tried at this plant, but the present arrangement, with two bridge walls, has been found preferable. As regards the coke made in the flue ovens, no chemical nor physical deterioration has been found to result from this treatment.

The experience here, so far, indicates the following points to be observed in the construction and management of such a plant to get the best results: 1. Build the flue of best material and of ample size. 2. Avoid a descending grade with the flue. 3. Have the boiler flues and stack of such size that the gas may meet with a minimum of friction in its passage; especially have the stack high enough. 4. Draw and charge the ovens very promptly and systematically, and take care to keep them covered, except when the damper is down, when they should be previously uncovered. 5. Keep the flue and boiler setting air-tight; do not attempt to supply fresh air with the gases at any point. This was tried at first here and elsewhere, and found to be a mistake.

The two plants here save from $3,000 to $4,000 a year in coal and wages. This company has also two similar plants at Pratt Mines, Ala., in successful operation, which save a large amount.

In 1895 the Howard-Harrison Iron Co. erected a most complete plant of this kind in connection with a coal-washing plant, and it uses the gas for other purposes, besides raising all the steam required at its large works.

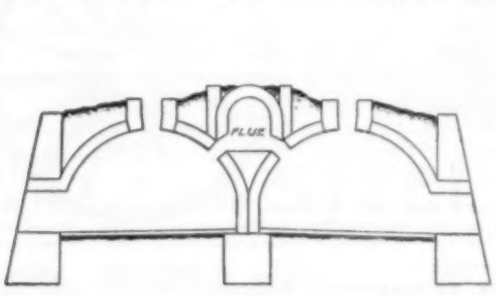


FIG. 1.

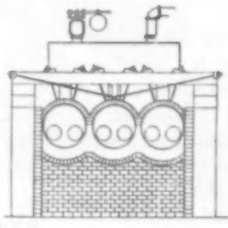


FIG. 2.

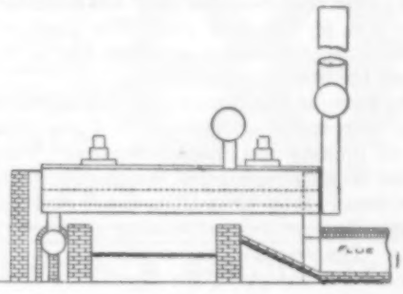


FIG. 3.

COKE OVEN BOILER PLANT AT TRACY CITY, TENN.

Durability of Steel Frame-Work.

The ability of the modern steel skeleton building to withstand a severe fire with but comparatively little damage to its framework, is becoming more certain with each fire to which such buildings are subjected. As we pointed out in our issue of May 20, the excellent behavior of the steel framing of the Horne store in the Pittsburg, Pa., fire of May 3, was one of the most notable and instructive facts brought out by that disaster. The same fact is shown more impressively, if it is possible, by the Leonard Building, which was burned in the fire at Detroit, Mich., on Oct. 7. This building was 10 stories high and of steel skeleton construction, with the columns and principal floor beams fire-proofed with hollow tile, but with ordinary wooden floors and, apparently, entirely without partitions on any floor, and very presumably, with open stairways and elevator shafts between the different floors. The rear windows, through which the fire was communicated, were entirely unprotected with shutters, giving the flames free access to each floor, filled with furniture and other highly combustible material. Under these conditions it is not surprising to find that the building was entirely gutted of its contents, and that the steel framing was stripped of its fire-proof protection and outside walls. The great wonder is that the integrity of the framework was preserved at all, yet it is found, to quote our correspondent, that "the columns and many of the floor beams and girders are still straight, as nearly as can be told from the closest inspection I have been able to make. The girders carrying the walls and most of the roof framing are too badly twisted to be of any further use, but the whole framework stands apparently solid, and it is claimed that much of it will be fit to use again." It may be, of course, that some modification of these statements will be found necessary when all the details are at hand, but the broad fact cannot, we think, be altered that the steel frame of this building was its most durable part under very unfavorable conditions of exposure to fire.—[Engineering News.

One of the principal causes of the cheapening of iron and steel products in this country has been the improved and cheapened methods of transportation. We have before pointed out the desirability of developing an American merchant marine, and of incorporating the same practical and economical ideas in ocean transportation that now obtain on land. When this has been done we cannot only compete with foreign countries on their tributary soil, but we can send our products abroad to all parts of the world indiscriminately. The great feature of the recent settling process has been the reduction of products to a basis of cost, and it now looks as if the wide fluctuations caused by unbalanced supply and demand belong to the past.—[Boiler Maker.

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HARRISON SAFETY BOILER WORKS
PHILADA. PA.
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Blanchard Iron Co., of Findlay, O., has been incorporated to manufacture iron and steel products. John D. Briggs, Hiram W. Briggs, Sarah E. Briggs, C. A. Barr and William A. Byar are the incorporators. The capital stock is $25,000. The Standard Tube & Forkside Co. has been formed, at Toledo, O., to take over the plant and business of the Standard Tube Co., of the same city. The plant will be started at once. C. M. Fairchild is president and C. S. Bigelow secretary of the new company.

The Sprague Electrical Co., with a capital of $5,000,000, has been incorporated at Trenton, N. J., by Albert B. Chandler, Ed. H. Johnson and Frank J. Sprague. The principal offices of the company will be at Watsessing, N. J. The object of the company is the manufacture of electrical appliances under the new Sprague method of using electricity for traction purposes. The company has taken over the contract already obtained for equipping the South Side Elevated Railroad in Chicago, and will operate the Sprague Electric Elevator Co.'s works at Watsessing. This will include the carrying out of a contract for the elevators for the underground railroad in London.

The Metal Storage Co., of Pittsburg, Pa., has been incorporated by Chas. I. Travelli, Stewart Johnston, Geo. W. Irwin, David McCargo and Edward D. Riddle.

The H. C. Albee Co. has been incorporated at Portland, Ore., with a capital stock of $5,000, to deal in second-hand machinery, by Geo. S. Smith, H. C. Albee and H. R. Albee.

The Cleveland Machine & Forging Co., of Glenville, O., has been incorporated by S. M. Neville, C. H. Olds, H. Neville, Wm. H. Monroe and Geo. O. Willet. Capital stock, $10,000.

The Missouri Car & Foundry Co., St. Louis, Mo., filed articles of incorporation, Oct. 6, with a capital stock of $2,000,000, all paid up. The incorporators are William McMillan, 12,660 shares; W. K. Bixby, 6,000 shares; W. N. McMillan, 1,000 shares; James Connolly, 330 shares, and F. F. Bixby, 10 shares. A reorganization and reincorporation of the company is all the move signifies. The same officers will remain at the head of the company.

Plattsburgh Foundry & Machine Co., of Plattsburgh, Clinton Co., N. Y., has been incorporated to manufacture iron and machinery. Capital stock, $6,000. Directors: Sidney S. Whittelsey, John Ross and John M. Wever, of Plattsburgh.

T. E. Ward & Co., New York, capital $5,000,000, commencing with $1,000,000, has been incorporated to manufacture street railway cars and all kinds of electrical machinery. T. E. Ward, N. F. Griffin, Chas. O. Larender and E. D. Fleetham, New York, N. Y.; E. W. Sadler, East Orange, N. J.

The Auburn Rex Wrench Co., of Auburn, N. Y., has been incorporated to manufacture pipe and nut wrenches. Capital stock, $5,000. Directors: J. C. Schreck, F. A. Van de Water, C. I. Mam and J. L. Eddy, of Auburn; F. J. Jenny, of Utica.

Clearfield, Pa., will build a new water works plant.

The Weston Furnace Co., Manistique, Mich., is reported to be planning the erection of a chemical works to cost $75,000.

A new pumping station to cost $170,000 will be built at Baltimore, Md.

The Gates Iron Works, Chicago, will carry out the project under cosideration more than a year ago and then laid aside, for the building of a new foundry. It will be well equipped with cranes and other handling apparatus.

New Construction:—

Riter & Conley, of Pittsburg, have secured a contract to erect two buildings for the Castalia Portland Cement Co., at Castalia, O. The buildings will be of steel structure, one 40 x 100 feet and the other 140 x 75 feet.

Plans have been prepared for a factory for the Ohio Brass & Iron Mfg. Co., Cleveland. It will be built of brick and will cost $9,000.

The Johnson tin plate works at New Castle, Pa., which will use the Arethusa sheet mill, may be a 10-mill plant.

Additions, Enlargements, Removals, Etc.:—

The Scottdale Iron & Steel Co., Scottdale, Pa., has sold its bar and muck mills, which are being torn out. When these are shipped away a new train of three sheet mills will be put in place. In addition the company is adding to its cold roll train another cold roll mill and another squaring shear. These improvements and additions to equipment will cost between $25,000 and $30,000. All traces of the recent strike have disappeared and the plant is running to full capacity.

The Bethlehem Iron Co., at South Bethlehem, Pa., has been making some additions to the plate mill. Two heating furnaces and a crane for handling slabs have been put up.

Owing to the rapidly growing demand for the Lunkenheimer brass and iron specialties for steam, water, gas, oils, etc., the Lunkenheimer Co., of Cincinnati, has again enlarged its facilities by adding a four story building 50x50 feet, which has been fitted up for general offices. The old office quarters are now as rapidly as possible being utilized for manufacturing purposes. These added facilities will enable the company to make prompter shipments than heretofore.

It is reported that $100,000 will be spent on additions and improvements to the American Steel Casting Co.'s Sharon, Pa., plant in the coming winter. The capacity will be doubled.

General Industrial Notes:—

The United Coke & Gas Co., Pittsburg, is building a number of houses for its workmen at Glassport, on ground recently purchased near its by-product coke plant.

The Porkhouse mill, Lower Allegheny, owned by the Pittsburg Forge & Iron Co., has resumed operations after a year's idleness. Thirty-four furnaces are now in operation, and it is expected to run the mill full in a short time.

Last Thursday's work in the rail mill at the Edgar Thomson Steel Works eclipsed anything yet on record. In the 12

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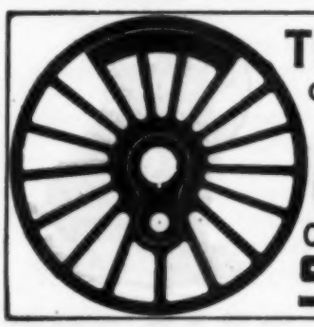

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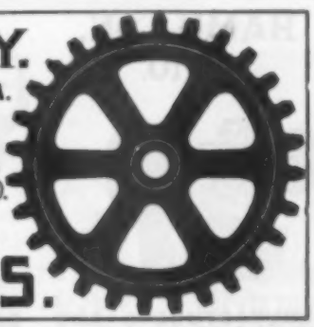

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ST. LOUIS, 516 N. Third St. WASHINGTON, Kellogg Bldg.
MONTREAL, J. G. Sibbald, 3 Windsor Hotel.
SAN FRANCISCO, John Woodlock, 26 Beale St.

hours after 6 A. M. there were rolled 2,900 rails of Class 73, something unprecedented in this class of work.

Car and locomotive building, as reported by the *Railway Age*, is as follows: The Philadelphia & Reading has ordered 200 gondola cars from the Michigan-Peninsular Car Co.; the D. L. & W. Ry. has bought 500 freight cars from the Jackson & Woodin Mfg. Co.; the K. C. P. & G. road has ordered 10 cabooses from the Pullman Co.; the Ensign Mfg. Co. will build 40 refrigerator cars for the Galveston, Harrisburg & San Antonio; the Southern Pacific is building at its own shops at Sacramento 10 passenger and six mail and express cars, the Astoria & Columbia River road has ordered three locomotives of the Cook Locomotive Works; the Chicago shops of the C. R. I. & P. Ry. will start at work on 10 new locomotives at once. The Seaboard Air Line is reported to be considering building 500 freight cars, and the Toledo & Ohio Central several hundredfreight cars.

The stockholders of the Sloss Iron & Steel Co., of Birmingham, Ala., will soon meet to authorize the issue of new securities to pay for contemplated improvements.

The Rankin Wire Works of the Consolidated Steel & Wire Co., Pittsburg, Pa., which have been closed for about two months, will soon resume. Extensive improvmeents have been made.

The Schoen Pressed Steel Co., of Pittsburg, Pa., has bought from the Oliver Iron & Steel Co. the lower mills of that concern, located in Lower Allegheny, Pa. This plant adjoins the works of the Schoen Pressed Steel Co., but has not been in operation for a long time. Part of the ground is occupied by tenement houses, which will be torn down to make room for extensions to the Schoen Pressed Steel Co.'s works. The plant may possibly be operated under lease by some concern other than the purchasers. It is the intention of the Schoen Pressed Steel Co. to make large additions to its plant in the near future, and it expects to be able eventually to turn out about 15 all-steel cars per day.

The Toledo (O.) Rolling Mill, has put on about 60 new men and added a night shift.

The "horse shoe" rolling mill of the Old Dominion Nail Works, at Richmond, Va., has started up after a long idleness.

At Bessemer, Ala., the Howard-Harrison Iron Co. has raised the wages of all its employes to what they were six months ago. The plant is running full.

The steel rail purchases of the Pennsylvania Co. announced last week were at $19 a ton for 30-ft. rails and $20 for 60-ft. rails. The new rails are to be used for double tracking the Atlantic City Division of the West Jersey & Seashore Railroad, and replacing old and lighter rails on other parts of the Pennsylvania Eastern lines. Contracts are also to be given

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123 AND 125 WATER STREET, **PITTSBURG, PA.** 124 AND 126 FIRST AVENUE.

MACHINE TOOLS AND SUPPLIES.

Some SECOND-HAND TOOLS in stock.

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One 8-foot BORING MILL. | One HORIZONTAL BORING and DRILLING MACHINE.

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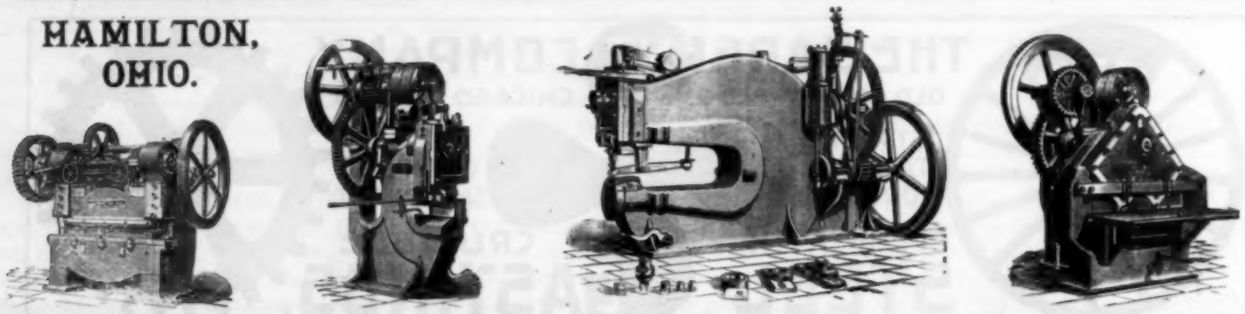
THE LONG & ALLSTATTER CO.

HAMILTON, OHIO.



MANUFACTURERS AND EXPORTERS OF **POWER PUNCHING AND SHEARING MACHINERY** ADAPTED TO ALL PURPOSES FOR BOTH HEAVY AND LIGHT WORK.

out for new rails for the Western lines, in which the Illinois Steel Co. will doubtless participate.

The Valley muck mill of the Stewart Iron Co., Sharon, Pa., will be put in operation soon after an idleness of many months.

Fannie Furnace, West Middlesex, Pa., is being put in readiness for resumption.

There is a prospect that the Wilkes rolling mill at West Middlesex, Pa., will be started up.

At Milwaukee $2,000,000, the agreed purchase price, was paid last week to the old stockholders of the J. I. Case Threshing Machine Co., of Racine, by J. T. Fisk, Frank G. Bigelow and H. A. J. Upham, of Milwaukee. Frank K. Bull is the only old stockholder who retained his stock. The old officers of the company resigned. Eastern capitalists are the new purchasers. The plant was started in 1843, and when running full employed 1,000 men.

At a meeting of the stockholders of the Canonsburg Iron & Steel Co., Pittsburg, the following officers were elected: H. H. Nieman, president; H. S. Duncan, vice-president; L. A. Meyran, secretary and treasurer, and John F. Budke, general superintendent.

The Brown-Bonnell Iron Co., Youngstown, O., has been running fuller of late than at any time since the late fall of 1895. More than 2,000 men have been employed recently.

At a recent cast iron pipe letting at New Britain, Conn., flat bids were made as follows on sizes ranging from 6-inch to 30-inch: McNeal Pipe & Foundry Co., Burlington, N. J., $17.40; Warren Foundry & Machine Co., Phillipsburg, N. J., $17.40; M. J. Drummond, New York, $17.84; Chattanooga Foundry & Pipe Works, $18.80; National Foundry & Pipe Works, Ltd., Scottdale, Pa., $17.40; R. D. Wood & Co., Philadelphia, $16.72.

THE *American Machinist* reports a cheerful tone in the machine tool business at Cincinnati. "Although there are some exceptions, the general report is that business is certainly better, and there are several cases of enlargements of shops and building of new shops which are now going on or are planned for the immediate future and are based upon an expectation of increased business. Cincinnati's foreign business in machine tools is important and seems to be growing. One case is reported in which 95 per cent of a shop's product was shipped abroad. The largest tool-building house there report not only a satisfactory foreign business, but also a gratifying increase of home trade as well. It is believed that more machine tools are now made in Cincinnati than in any other city of the world."

AN INVENTION is reported to have been perfected by Wm. Thatcher and Wm. Jenkins, two tin plate mill workers in New Castle, by which a considerable saving is secured in the manufacture of black plates. It consists of a doubling machine, which saves the hand labor now expended in that process. Doublers earn $6 and upwards a day. The machine, it is stated, will do the work with half this expenditure for labor. On a large mill the annual saving would run well into thousands of dollars.

THE Philadelphia Bourse, which maintains a permanent exhibition of American manufactures, is about to inaugurate a special exhibition to be opened from Oct. 15 to Dec. 15, called the Novelties Exhibition. The special purpose of this is to bring out and emphasize recent improvements and developments in machinery, the plan being to rule out old or standard lines of goods.

A NOTABLE addition to the already extensive electrical plant of the Niagara Falls Hydraulic Power and Mfg. Co. in the power house at the foot of the cliff, at Niagara Falls, N. Y., will shortly be made in the form of a General Electric Co. electrolytic generator, which will be the largest of its kind ever constructed. It will be both liberally and carefully de-

signed to enable it to cope with the very severe service of electrolytic work, i. e., for practically continuous operation.

This machine will have 14 poles and will run at 257 revolutions, giving an output of 5,000 amperes at 175 volts, or a capacity of 875 kilowatts. It will be of the latest type and will be directly connected to the water wheel shaft. It will be provided with a special panel switchboard with full form K equipment of instruments necessary to handle a current of 5,000 amperes.

The General Electric Co. is already well represented in the power house of the Niagara Falls Hydraulic and Mfg. Co. Two of its six-pole 560-k.w. 300-revolution 650-volt railway machines, both directly coupled to the same turbine shaft, supply current to the Great Gorge Railway. In addition, the station contains a G. E. booster and two other generators, one of 100 and one of 90 k. w.

THE CENTRAL PASSENGER ASSOCIATION 1000 MILE INTERCHANGEABLE REBATE TICKET

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Findlay, Ft. Wayne & Western,
Flint & Pere Marquette,
Grand Rapids & Indiana,
Indiana, Decatur & Western,
Lake Shore & Michigan Southern,
Louisville & Nashville (between Louisville and Cincinnati and between St. Louis and Evansville),
Louisville, Evansville & St. Louis,
Louisville, Henderson & St. Louis,
Michigan Central,
New York, Chicago & St. Louis,
Ohio Central Lines,
Pennsylvania Lines West of Pittsburg,
Peoria, Decatur & Evansville,
Pittsburg & Lake Erie,
Pittsburg & Western,
Pittsburg, Lisbon & Western,
Toledo, St. Louis & Kansas City,
Vandalia Line,
Wabash Railroad, Zanesville & Ohio River.

The price of these Tickets is $30 each. They are not transferable. If the ticket is used in its entirety and exclusively by the original purchaser, a rebate of $10 is paid by the Commissioner of the Central Passenger Association.

E. A. FORD,
General Passenger Agent.

Pittsburg, Pa.,
Sept. 30, 1897.

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CHICAGO, ILL.

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This will give you the population, city and county debt, death rate, assessed valuation of property, tax rate, annual shipments, raw materials, industries desired, etc.

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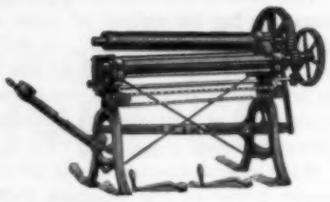

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Producers of SILICA, FIRE and CORE SAND. Also MOLDING SAND for STEEL CASTINGS. Write for Prices.

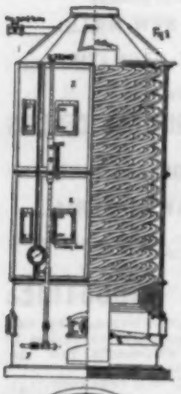
Persistence in Advertising

Is one of the requisites of satisfactory results. In the expansion of business which is confidently expected in the United States in the very near future, advertisers who have made themselves regularly prominent in the past two years will be first to reap the rewards of persistent publicity.

The Iron Trade Review has a rapidly growing constituency in the great Central Zone, the best buying section in the country, as machinery manufacturers and establishments devoted to power equipment have found out in the past three years. Between the Alleghenies and the Mississippi are located many of the most prosperous industries in the country, and they have been buyers when there was only limited business in other sections. Advertisers are coming to recognize this fact, as the growing patronage of the columns of this paper gives abundant testimony.

THE CLONBROCK STEAM BOILER CO.,

BROOKLYN, N. Y.



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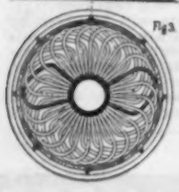

THE "CLIMAX" IS BUILT IN UNITS OF 50 TO 1,000 H. P
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CHAPTER HEADINGS:—Iron—What is it? Pig Iron. Constituents of Iron. Numbering of Pig Iron. Grading of Iron. How to reduce cost of mixture. Steel. Physical Properties of Metals Defined. Statistics. Early History and Manufacture of Iron.

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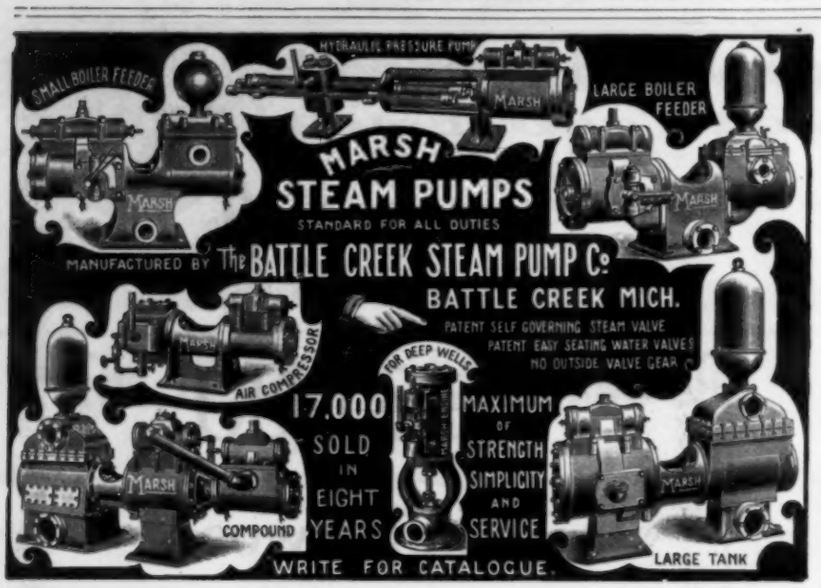

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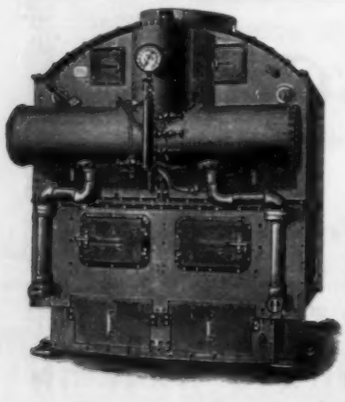

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PATENT SECTIONAL WATER TUBE BOILERS

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Steamships, River Steamers, both propellers and stern wheels, Torpedo Boats, Fire Boats, Yachts and Launches, Donkey Boilers for Steamships, and for all kinds of Stationary Work.

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It is one-third the weight of the Scotch Boiler for the same power and efficiency. It is non-explosive. No priming, and easy to manage.

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saves Time and Work, prevents Accidents and is Efficient and Simple. All sizes from ½ to 15 tons capacity kept in stock, insuring pr mpt shipments.

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Send for our catalogue with latest discount sheet.

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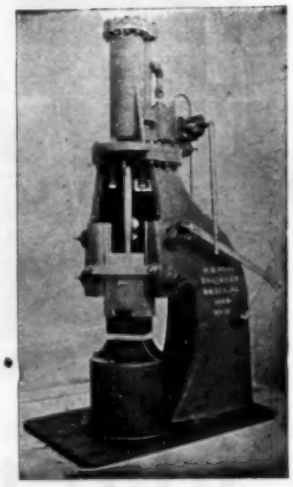

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*Daily. †Daily except Sunday.

‡Daily except Saturday. ‡Saturdays only.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	† 3:15 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	* 5:00 pm	* 8:40 am
Philadelphia and New York	*11:10 pm	* 4:30 am
Baltimore and Washington	*11:10 pm	* 4:30 am
Alliance and Pittsburgh	*11:10 pm	* 4:30 am

Mt. Vernon and Pan-Handle Route

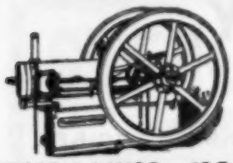
FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:50 am	* 5:30 pm
Akron and Columbus	* 8:50 am	* 5:30 pm
Akron and Columbus	† 1:40 pm	†12:10 pm
Col. Cin. Ind. & St. L.	‡ 8:00 pm	* 7:30 am
Col. Cin. Ind. & St. L.	‡ 11:30 pm	.....

The Cleveland Terminal & Valley R. R. Co.

(B. & O. System.)

Depot foot of So. Water St. City Office 241 Superior St.	Arrive.	Depart.
Valley Jctn. & Way Stations	*6:20 P M	*7:10 A M
Akron, Canton & Valley Jct	*10:00 A M	*5:30 P M
Akron, Canton & Chicago	*8:10 A M	*6:35 P M
Akron, Canton & Wooster, Defiance, Garrett, Marietta, Wheeling, Washington, D. C., and Baltimore	†2:25 P M	†11:30 A

†Daily except Sunday. *Daily. Pullman's Palace Vestibule sleeping cars between Cleveland and Chicago.



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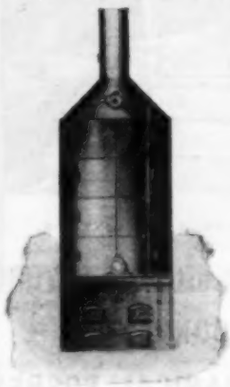

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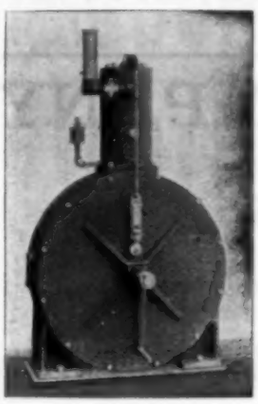

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SIMPLICITY,
ECONOMY.

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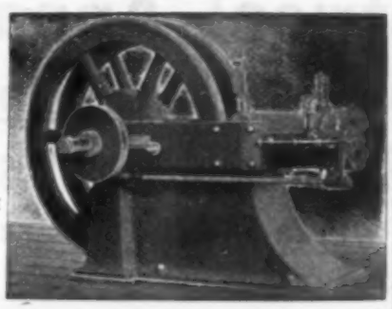

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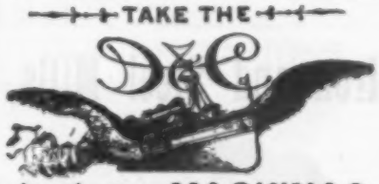

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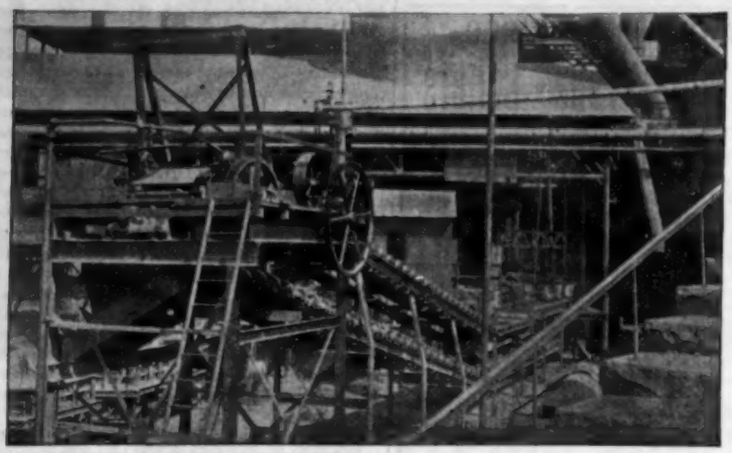

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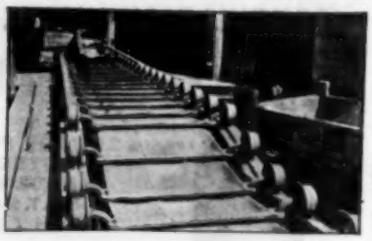

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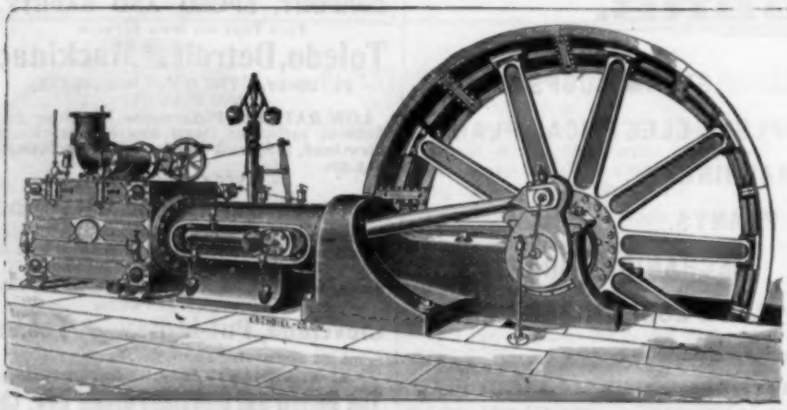

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Exhaust Fans,
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For REMOVING CHIPS, SHAVINGS AND SAWDUST FROM WOOD-WORKING MACHINERY, DUST FROM BUFFING AND EMERY WHEELS, TUMBLING BARRELS AND LIKE OPERATIONS.

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SOFTNESS, STRENGTH, FLUIDITY, UNIFORMITY.

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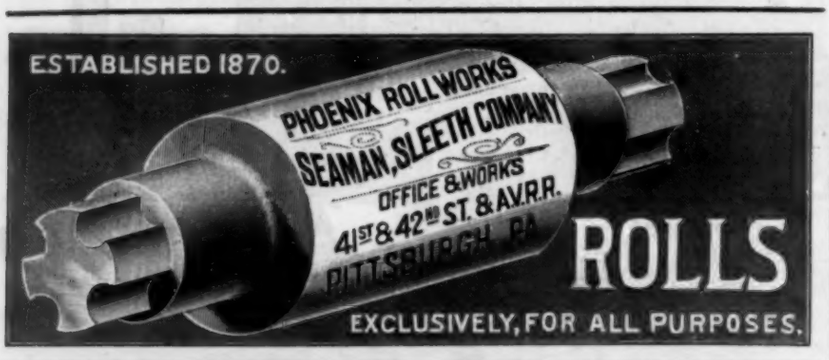

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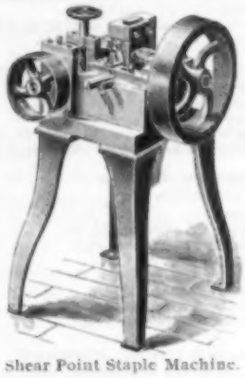

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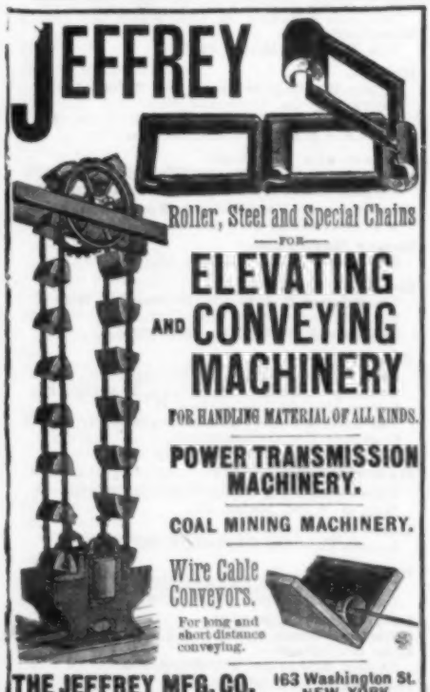

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Jos. Dixon Crucible Co., Jersey City, N. J.

Pattern Works—
Gobeille Pattern Co., Cleveland, O.

Perforated Sheet Metal—
Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
A. J. Beckley & Co., Garwood, N. J.

Phosphor Bronze Castings—
Nolte Brass Co., Springfield, O.
Lorain Foundry Co., Lorain, O

Pig Iron—
Pickands, Brown & Co., Chicago, Ill.
Clinton Iron & Steel Co., Pittsburg.
Forster, Waterbury & Co., Chicago, Ill.
W. H. Bosworth, Cleveland, O.
Bourne-Fuller Co. Cleveland, O.
M. A. Hanna & Co., Cleveland, O.
E. H. Stroud & Co., Chicago, Ill
Miller, Wagoner & Bentley, Chicago, Ill.
Rogers, Brown & Co., Cincinnati, O.

Pipe Covering—
C. H. Besly & Co., Chicago, Ill.

Pipe
W. H. Bosworth, Cleveland, O.

Planers—
Lodge & Shipley Machine Tool Co., Cincinnati.
U. Baird Machinery Co., Pittsburg, Pa.

Plates—
Enterprise Boiler Co., Youngstown, O.

Plumbers' and Gas Fitters' Supplies—
C. H. Besly & Co., Chicago, Ill.

Pneumatic Appliances—
Clayton Air Compressor Works, New York.

Portable Forges—
C. H. Besly & Co., Chicago, Ill.
B. F. Sturtevant Co., Boston, Mass.

Power Presses—
Bertsch & Co., Cambridge City, Ind.
Long & Allstattar Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.

Power Transmission Machinery—
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Jeffrey Mfg. Co., Columbus, O.
The Lane & Bodley Co., Cincinnati, O.

Presses—
Toledo Machine & Tool Co., Toledo, O.
Bertsch & Co., Cambridge City, Ind.
C. H. Besly & Co., Chicago, Ill.
Long & Allstatter Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.

Pressure Reducing Valves—
W. H. Bosworth, Cleveland, O.

Pulleys—
W. A. Jones Foundry Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.

Pumps (Steam)—
Battle Creek Steam Pump Co., Battle Creek, Mich.
The Edward P. Allis Co., Milwaukee, Wis.
Henry R. Worthington, Brooklyn, N. Y.
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.
W. H. Bosworth, Cleveland, O.

Pyrometers—
Edward Brown, Philadelphia, Pa.

Radial Drills—
Dietz, Schumacher & Boye, Cincinnati, O.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.

Riveting Machinery—
Wm. H. Wood, Media, Pa.

Rock Drills—
Rand Drill Co., Chicago, Ill.
The Ingersoll-Sergeant Drill Co., New York.

Rolling Mill Machinery—
The Lloyd Booth Co., Youngstown, O.

Roofs—
Shiffler Bridge Co., Pittsburg.

Sand and Chill Rolls—
The Lloyd Booth Co., Youngstown, O.
Lorain Foundry Co., Lorain, O.
Seaman, Sleeth Co., Pittsburg, Pa.

Saws—
Peter Gerlach & Co., Cleveland.

Screens for Coal Ore, Etc.
Robt. Aitchison Perforated Metal Co., Chicago.
Harrington & King Perforating Co., Chicago.
Jeffrey Mfg. Co., Columbus, O.

Screws—
C. H. Besly & Co., Chicago, Ill.
Upson Nut Co., Cleveland, O.
Chicago Screw Co., Chicago, Ill.

Semi-Steel—
The King & Andrews Co., Chicago, Ill.

Shafting—
The Lane & Bodley Co., Cincinnati, O.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City Ind.
Toledo Machine & Tool Co., Toledo, O
Wm. H. Wood, Media, Pa
Long & Allstatter Co., Hamilton, O.
Perkins Machine Co., Boston, Mass.
Fox Machine Co., Grand Rapids, Mich.

Sheet Iron—
Cleveland Rolling Mill Co., Cleveland
Wire Standard Iron & Steel Co., Bridgeport, O
E. H. Stroud & Co., Chicago, Ill.

Special Machinery—
Toledo Machine & Tool Co., Toledo, O.
Edwin Harrington Son & Co., Philadelphia.
Perkins Machine Co., Boston, Mass.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Pipe and Boiler Covering—
C. H. Besly & Co., Chicago Ill

Steam Packing—
C. H. Besly & Co., Chicago, Ill.

Steam Shovels and Dredges—
The Bucyrus Co., South Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.

Steam Specialties—
C. H. Besly & Co., Chicago, Ill.

Steel—
Otis Steel Co., Cleveland, O.
Miller, Wagoner & Bentley, Chicago, Ill.
E. H. Stroud & Co., Chicago, Ill.

Steel Castings—
The Sargent Co., Chicago, Ill.
W. H. Bosworth, Cleveland, O.
The King & Andrews Co., Chicago, Ill.
Otis Steel Co., Cleveland, O.

Steel Rails, Blooms and Billets—
Cleveland Rolling Mill Co., Cleveland
Bethlehem Iron Co., South Bethlehem,
Cambria Iron Co., Johnstown, Pa.

Steel Stamps and Stencils—
J. H. Ficharty & Co., Cleveland.

Stokers—
Playford Stoker Co., Cleveland, O.
Brightman Furnace Co., Cleveland, O.
Westinghouse, Church, Kerr & Co., New York City.

Tanks—
Enterprise Boiler Co., Youngstown, O
Meehan Boiler & Construction Co., Lowellville, Ohio.

Tinning Machinery—
W. H. Bosworth, Cleveland, O.
The Lloyd Booth Co., Youngstown, O.

Tin Plate—
Ætna-Standard Iron & Steel Co., Bridgeport, O

Tin and Terne Plates—
B. P. Crane & Co., Chicago, Ill
E. H. Stroud & Co., Chicago, Ill.

Tool Steel—
C. H. Besly & Co., Chicago, Ill.

Transmission Machinery—
Link-Belt Machinery Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.
Jeffrey Mfg. Co., Columbus, O.

Tube Welding—
S. Fix Sons, Cleveland.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland
W. H. Bosworth, Cleveland, O.

Twist Drills—
C. H. Besly & Co., Chicago, Ill.

Valves—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.
The Lunkenheimer Co., Cincinnati, O.

Ventilating Fans—
B. F. Sturtevant Co., Boston Mass.

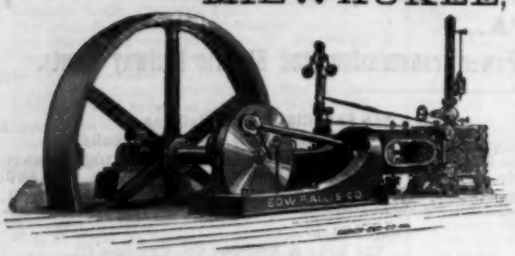
Wheelbarrows—
Akron Cultivator Co., Akron, O.
Lansing Wheelbarrow Co., Lansing, Mich.

Wire Machinery—
John Adt & Son New Haven Conn.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, Ohio.
Wm. Glader, Chicago, Ill.

Wire Nail Machinery—
Wm. Glader, Chicago, Ill.

THE EDWARD P. ALLIS COMPANY

MILWAUKEE, WIS.



MANUFACTURERS OF

ICE and REFRIGERATING MACHINERY, Blowing Engines, Hoisting Engines, Pumping Engines Air Compressors, Special Engines for Electric Lighting Street Railways and Rolling Mills. Ore Crushers, Crushing Rolls, Stamp Mills Concentrators, General Mining Milling and Smelting Machinery.

Reynolds Corliss Engines.

NEW YORK. CHICAGO. MINNEAPOLIS. DENVER. BUTTE. CITY OF MEXICO. SAN FRANCISCO PITTSBURG.

The A B C of Iron.—A book for foundrymen. It is issued in cloth binding, and gives much valuable matter on how to reduce cost of mixtures, and on grading and numbering of pig iron. CHAPTER HEADINGS:—Iron—What is it? Pig Iron. Constituents of Iron. Numbering of Pig Iron. Grading of Iron. How to Reduce Cost of Mixture. Steel. Physical Properties of Metals Defined. Statistics. Early History and Manufacture of Iron. Former price $2.00, NOW $1.00. Order of *The Iron Trade Review Co.*, 27 Vincent St., Cleveland, O.

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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

Special low-phosphorus hard Ore, Bessemer	$3.40@3.46
No. 1 Specular, Bessemer	3.05@3.17
No. 1 Bessemer hematite	2.60@2.90
Hematites No. 1 non-Bessemer	2.00@2.25
No 1. Specular, non-Bessemer	2.40@2.60

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$10 50@10 75
No. 1 Strong Foundry	10 65@10 75
No. 2 Strong Foundry	10 15@10 25
No. 1 Gray Forge, red short	9 75
No. 2 Gray Forge, neutral	9 90
No. 1 American Scotch	10 65@10 90
No. 2 American Scotch	10 15@10 40
Lake Superior Charcoal	12 25@12 50
PITTSBURG:	
No. 1 Foundry	$11 00@11 25
No. 2 Foundry	10 65@10 90
Gray Forge	9 75 10 00
White and Mottled	9 50
Warm Blast Charcoal	13 00@13 50
Cold Blast Charcoal	16 00
Bessemer	9 90@10 10
CHICAGO:	
Lake Superior Charcoal	$12 50@$13 00
Local Coke Foundry No. 1	11 50@12 00
Local Coke Foundry No. 2	11 00@11 50
Local Coke Foundry No. 3	10 50@11 00
Local Scotch Foundry No. 1	11 50@12 00
Local Scotch Foundry No. 2	11 00@11 50
Local Scotch Foundry No. 3	10 50@11 00
Southern Coke No. 1	11 00@11 25
Southern Coke No. 2	10 60@10 85
Southern Coke No. 3	10 35@10 60
Southern No. 1 Soft	11 00@11 25
Southern No. 2 Soft	10 60@10 85
Southern Silveries	11 25@11 50
Jackson Co. Silveries	12 50@14 50
Ohio Silveries No. 1	@
Ohio Strong Softeners	12 00@12 25
Alabama Car Wheel	16 00@17 00
Malleable Bessemer	10 75@11 00
Coke Bessemer	11 50@12 00
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 10 00
Southern Coke No. 2 and No. 1 Soft	9 50@10 00
Hanging Rock Coke, No 1	12 50@13 50
Hanging Rock Charcoal No. 1, Fdy	14 50@15 50
Tennessee Charcoal No 1	12 50@13 00
Jackson County Silvery No 1	12 50@13 00
Southern Coke, Gray Forge	8 25@8 50
" " Mottled	8 25@8 50
Standard Georgia Car Wheel	14 25@15 00
Tennessee " "	13 00@14 00
Lake Superior " "	14 75@15 25
BUFFALO:	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	11 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	10 75
Ohio Strong Softener No. 1	11 75
Jackson Co. Silvery No. 1	14 00
Lake Superior Charcoal	15 50
Southern Soft No. 1	11 75
Hanging Rock Charcoal	17 00
ST. LOUIS:	
Southern Coke No 1	$ 9 50@$ 9 75
Southern Coke No. 2	9 00@ 9 25
Southern Coke No. 3	8 50@ 8 75
Southern Gray Forge	8 00@ 8 25
Southern Charcoal No. 1	13 00
Missouri Bessemer	19 00
Ohio Softeners	13 50
Lake Superior Car Wheel	14 50
Southern Car Wheel	14 50

OLD RAILS AND SCRAP METAL.

[Delivered Cleveland.]	GROSS TONS
Old iron rails	$14 00
Old steel rails (6 ft. and over)	10 50
Old steel rails (6 ft. and under)	10 00
Old car wheels	11 00
	NET TONS
No. 1 R. R. wrought scrap	$11 50
Mill scrap	8 50
No. 1 Machine cast scrap	8 00
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	6 50
Cast borings	5 25
Uncut wrought iron boilers	3 50
Steel boiler plates	8 00
Grate bars	5 25
Pipes and flues (clean)	7 50
Tank iron	7 00
Hoop and band iron	6 50
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	8 50

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. Cleveland)	1.15¢
Angles	1.15¢
Tees	1.25¢
Universal Plates	1.15@1.20¢
Sheared Plates	1.20¢

MERCHANT IRON AND STEEL.

[Less than car-lots, Cleveland.]

Rounds and Squares.—Bar Iron.

1 to 1⅞	1.10 Base.
2 to 2⅝	.20 extra.
3 to 3½	.50 "
3½ to 4	.80 "
4¼ to 4½	1.00 "
4¾ to 5	1.30 "
5¼ to 6	1.80 "
6¼ to 6½	2.20 "

PERFORATED METALS

OF ALL KINDS FOR

MILLING, MINING AND AGRICULTURAL MACHINERY.

Perforated Iron, Steel, Copper, Brass, Tin, Zinc, Lead, Etc., to Order.
Large and Varied Assortment of Sizes. Correspondence Solicited.

THE ROBERT AITCHISON PERFORATED METAL CO.,

Office, Room 510, 265 to 269 Dearborn St., CHICAGO, ILL. Works, So. Chicago.

..'96 JENKINS '96..

Is the Perfection of Joint Packing. Instantaneous. Does not Squeeze Out and not Necessary to follow up Joint. We guarantee it to last for years on any and all pressures of steam or any kind of joint where packing is required. Does not Rot, Burn or Blow Out, therefore the best for all purposes. Call for and insist on having '96 JENKINS '96 stamped like cut.

Jenkins Bros., New York, Boston, Philadelphia Chicago.

Akron Tubular Steel Wheelbarrows.

RE-INFORCED TRAYS.
SOLID FRAME.
NO HOLES DRILLED INTO IT.
ALL PARTS CLAMPED ON.

Perfect Forward Dump.
Strongest, Easiest Handled.
Lightest and Most Durable.

McNEIL'S PATENT BALANCED AUTOMATIC DUMP CHARGING BARROW.

The Akron Cultivator Co.,
MANUFACTURERS, Akron, Ohio.

TUBULAR STEEL BARROWS.

Special hand-made pig iron barrows.

WHEELBARROW CARS AND TRUCKS

WRITE FOR CATALOGUE.

LANSING WHEELBARROW CO.,
Lansing Mich.

Don't Waste Money in Your Pattern Shop.

THE GOBEILLE PATTERN CO., Cleveland.

Not every insertion of every advertiser's card brings an order for the advertiser's good; no more does every visit of the traveling salesman result in a sale.

There is a vast deal in familiarity with the type and phrase in which a manufacturer makes himself known to the advertisement reader, just as the personal acquaintance of his traveling salesman gets him a hearing when a strange face and a strange voice are bowed out with a "busy day's" courtesies.

The best advertisers, the most successful advertisers, the advertisers who get returns, are those who keep everlastingly at it.

This is a case in which familiarity breeds business.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.
CLEVELAND OHIO.

ORDER DIRECT FROM THE
Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

6½ to 7¾	2.50 extra.
¼ to ⅜	.10 "
⅝ to 11-16	.20 "
½ to 9-16	.30 "
7-16 to 13-32	.40 "
⅜ to 13-32	.50 "
5-16 to 11-32	.70 "
¾ to 9-32	.90 "
7-32	1.40 "
3-16	2.50 "

Flats.—Bar Iron.

1⅛ to 4 x ⅜ to 1	1.05 Base.
4¼ to 6 x ⅜ to 1	.10 extra
6¼ to 8 x ⅜ to 1	.60 "
8¼ to 10 x ⅜ to 1	.80 "
1⅜ to 4 x 1 1-16 to 1⅜	.30 "
4¼ to 6 x 1 1-16 to 1⅜	.40 "
6¼ to 8 x 1 1-16 to 1⅜	.60 "
8¼ to 10 x 1 1-16 to 1⅜	.90 "
2 to 4 x 1⅜ to 2	.50 "
4¼ to 6 x 1⅜ to 2	.60 "
6¼ to 8 x 1⅜ to 2	.80 "
8¼ to 10 x 1⅜ to 2	1.00 "
2 to 4 x 2⅛ to 3	.60 "
4¼ to 6 x 2⅛ to 3	.80 "
6¼ to 8 x 2⅛ to 3	1.00 "
1⅛ to 1¾ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ⅝	.20 "
¾ to 15-16 x ⅜ to ⅝	.40 "
⅝ to 11-16 x ⅜ to ⅝	.50 "
½ to 9-16 x ⅜ to ⅝	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1⅛ to 4 x ¼ to 5-16	.20 "
1 to 1⅜ x ¼ to 5-16	.30 "
¾ to 15-16 x ¼ to 5-16	.50 "
⅝ to 11-16 x ¼ to 5-16	.80 "
⅜ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1 10 c. per lb. higher than ¼ to 5 16 thick. **Bevel Edge shaft Iron** 1-10 higher than same size of Heavy Bands.

Light Band Iron.

7 to 8 x No 9 to 3-16	.90 extra
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¼ to 4 x No. 9 to 3-16	.40 "
1¼ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40
⅜ x No. 9 to 3-16	1.50
⅜ x Nos. 10, 11 and 12	1.60

Bevel Edge Box Iron.

Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in.

Sand Band Iron, 1-10 c. above same sizes of Light Bands.

Oval Iron.

⅜ to 1⅜	.40 extra.
⅜ to 13-16	.50 "
½ to 11-16	.80 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
½ to 9-16 x 3-16	1.00 "
½ to 11-16 x ¼	1.20 "

Half Oval and Half Round.

2¾ to 3	.60 extra.
⅞ to 2	.50 "
¾ to 13-16	.70 "
⅝ to 11-16	.90 "
½ to 9-16	1.20 "
⅜ to 7-16	2.50 "
5-16	3.50 "
¼	4 50 "

Half Ovals less than ¼ their width in thickness, extra price.

Horse Shoe Iron.

All sizes 1 c. extra.

Cutting ordinary bars to specified length, .20 to .30 extra, according to length and size.

Steel Bands.

Width In Inches.	English Standard Gauge.		
1 1-2 to 6,	Nos. 7, 8, 9 or 3-16 "	1.50	Base.
		Extras.	
1½ to 6,	" 10, 11, 12 or 1/4"	.05	per 100 lbs.
1 to 1⅜,	" 7, 8, 9 or 3-16"	.10	"
1 to 1⅜,	" 10, 11, 12 or 1/4"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or 1/4"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10, 11, 12 or 1/4"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10 11, 12 or 1/4"	.45	"
½,	Nos. 7, 8, 9 or 3-16"	.55	"
½,	" 10, 11, 12 or 1/4"	.60	"
7-16	" 7, 8, 9 or 3-16"	.75	"
7-19	" 10, 11, 12 or 1/4"	.85	"
⅜,	" 7, 8, 9 or 3-16"	.95	"
⅜,	" 10, 11, 12 or 1/4"	1.05	"

Iron and Steel Hoops.

Width in Inches.	English Standard Gauge.		
1 7-16 to 3	Nos. 13, 14, 15 and 16	1.60	Base
		Extras	
1 7-16 to 2,	" 17, 18, and 19	.05	per 100 lbs
1 7-16 to 2,	" 20	.10	"
1 7-16 to 2,	" 21	.15	
1 7-16 to 1¾,	" 22	.25	
1 ⅛ to 1¾,	" 13, 14 and 15	.05	
1⅛ to 1¾	" 16, 17, and 18	.10	

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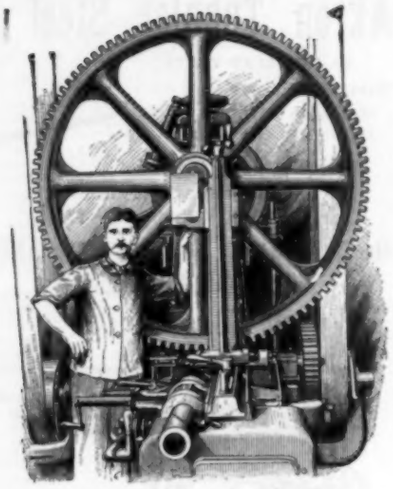

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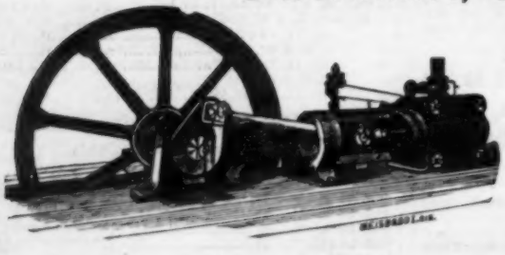

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15-16 and 1,	"	13, 14 and 15	.10 "
15-16 and 1,	"	16, 17 and 18	.15 "
15-16 and 1,	"	19 and 20	.20 "
15-16 and 1,	"	21	.25 "
15-16 and 1,	"	22	.35 "
⅞,	Nos.	13, 14 and 15	.20 "
⅞,	"	16, 17 and 18	.25 "
⅞,	"	19 and 20	.30 "
⅞,	"	21	.35 "
⅞,	"	22	.45 "
¾ and 13-16	Nos.	13, 14 and 15	.30 "
¾ and 13-16	"	16, 17 and 18	.35 "
¾ and 13-16	"	19 and 20	.40 "
¾ and 13-16	"	21	.45 "
¾ and 13-16	"	22	.50 "
¾ and 13-16	"	23	.60 "
11-16,	Nos.	13, 14 and 15	.35 "
11-16,	"	16, 17 and 18	.40 "
11-16,	"	19 and 20	.50 "
11-16,	"	21	.60 "
11-16,	"	22	.70 "
11-16,	"	23	.80 "
⅝,	Nos.	13, 14 and 15	.40 "
⅝,	"	16, 17 and 18	.45 "
⅝,	"	19 and 20	.55 "
⅝,	"	21	.65 "
⅝,	"	22	.75 "
⅝,	"	23	.85 "
9-16,	"	13, 14 and 15	.45 "
9-16,	"	16, 17 and 18	.50 "
9-16,	"	19 and 20	.60 "
9-16,	"	21	.70 "
9-16,	"	22	.80 "
9-16,	"	23	.90 "
½,	"	13, 14 and 15	.55 "
½,	"	16, 17 and 18	.60 "
½,	"	19 and 20	.70 "
½,	"	21	.80 "
½,	"	22	.90 "
½,	"	23	1.00 "
7-16,	"	13, 14 and 15	.80 "
7-16,	"	16, 17 and 18	.90 "
7-16,	"	19 and 20	1.00 "
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⅜,	"	16, 17 and 18	1.10 "
⅜,	"	19 and 20	1.20 "

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No. 10	1 50
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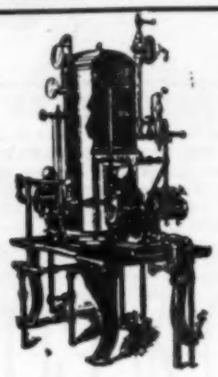

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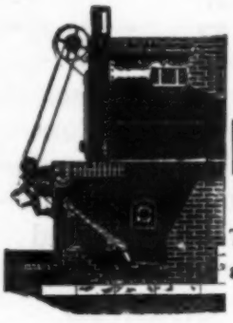

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Marine Flange	1 60
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90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special.

Flats.	cts. lbs.
2 to 9-16 in. wide by 2 to ½ thick	.08

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Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

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ROUND, SQUARE, AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	.08
9-16 to ½ in. "	.08
7-16 to ⅜ and 2⅜ to 3 in.	.09
3⅛ to 4 in.	.09½
⅝ to 11-16 and 4⅛	.10
⅛ to 6 in.	.10½
¼ to 9-32 and 6⅜ to 7 in	.11
1 in.	.13

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 60
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 55

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Lap weld black, base, and 10 per cent	.78
Butt " " " "	.72
Lap " galv. " "	.70
Butt " " " "	.67
Boiler tubes 2¼" and smaller	.72½
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Casing inserted joint	dis. 45

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	Bullock's	dis 50&10
Moulders'		dis 40&40&10
Hand		dis 40&10@50

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Boston Belting Co.'s standard	dis 5 & 10
" " " extra	dis 60&10
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 50
Shults Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

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B. F. Sturtevant's	dis 30
Boston Blower Co.,	dis 35

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Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 80
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 33⅓
Horton's Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 45
Sweetland "	dis 40
Almond Drill	dis 40
Morse "	dis 20
Skinner's Combination Lathe	dis 40&15
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 30

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 10 to 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

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Cast Steel	₩ 3½
Iron, steel points	₩ lb 4

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Twist Drills	
Morse Taper&Straight Shank to 1½"	dis 50&10 to 60
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 60@60&5
Cleveland " "	dis 60@60&5

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	No. 4 to No. 54	150 gr.	Flour, F. F
	46 gr.		
Kegs, ℔ lb	4½c	5 c	2½c
½ kegs ℔ lb	4¾c	5¼c	2¾c
¼ kegs ℔ lb	5 c	5¾c	3 c
10 lb cans, 10 in case	6 c	6¾c	5 c
10 lb cans less than 10	10 c	10 c	¾c

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Northampton dis 50
Crystal dis 65@70
Vitrified dis 60@70
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Hamden dis 60&10@70
Cyclone dis 60@60&10

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Arcade dis 60&10@60&10&10
Nicholson dis 60&10@60&10&10
" X. F. dis 25
Kearney & Foot dis 60&10@60&10&10
Black Diamond dis 60&10@60&10&10
McClellan dis 60&10@60&10&10
Disston's dis 65@70
Western dis 70
Stub's dis 25
Grobet's dis 30
Reynolds Bros.' Hand Cut dis 50
Industry File Works Hand Cut dis 50

Hammers.

P. S. W dis 40
Atha new list, Jan. 15, 1887 dis 50
Heavy hammers and sledges under 5 lbs. 10c
" " " " over 5 lbs. 8c

Jack Screws.

Illinois Bolt Co. list dis 75

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Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5¾	4½	4	3¾	3⅛
Hexagon	15⅜	11⅜	8¾	6	5¼	5¾	
Washers	9	8	7	5	4¾	4½	4⅜

In lots less than 100 lbs, ℔ lb add ¼c., 1 lb boxes add 1c to list.

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Car lots $1 50
Less than car lots $1 60

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Brass and Copper dis 5
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Railroads, 5 to 6 lbs. $12 dis 6
" 6 to 7 lbs. $13 dis 6

Rivets.

Iron, Thousand, list November 1, 1894 dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894 dis 60@65
Copper dis 50@50&1

Taps.

Cards, Hand and Nut to 2 in. dis 5
Carpenters' " " " dis 5
Morse " " " dis 5
Pratt & Whitney " " " new list dis 1
Machine Screw Taps dis 5
Pipe Taps to 2¼ in. dis 7
Stay Bolt Taps dis 25
Stove Bolt Taps dis 5
Pulley Taps dis 40

Vises.

Solid Box dis 0
Parker's dis 20@2
Prentiss dis 2
Stephen's dis 25@3
Barrett's dis 3
Miller's Falls dis 4
Merrill's dis 15@20
Howard dis 3

Wire.

New List, Apr. 9, 1894

Brass dis 35
Copper dis 35
Bright and annealed, Nos. 6@18 dis 70&10&5
" " Nos. 19@26 dis 75&5&5
" " Nos. 27@36 dis 75&10&5
Coppered Nos. 0 to 18, market list dis 70@70&5
Galvanized Nos. 0 to 18 " " dis65&5
Tinned market Nos. 0 to 18 dis 67½
Cast steel dis 50
Tinned Broom Wire dis 70&5@70&10
Annealed Fence, Nos. 8 and 9 dis 75
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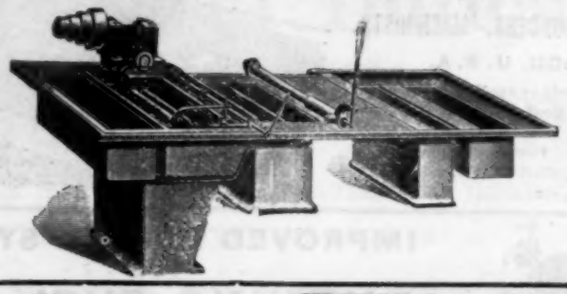
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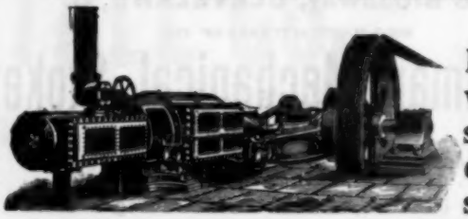
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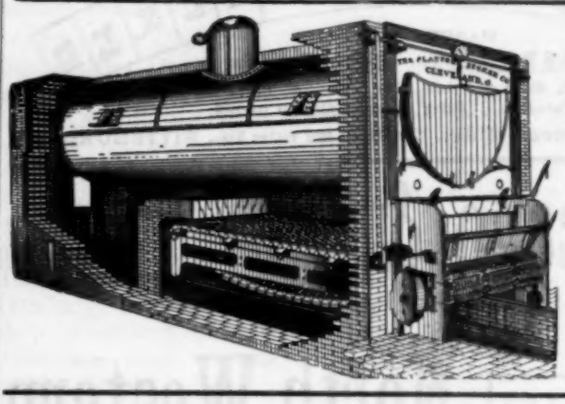
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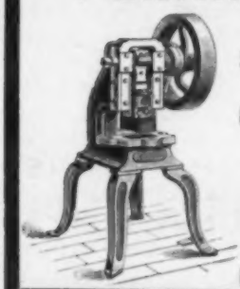

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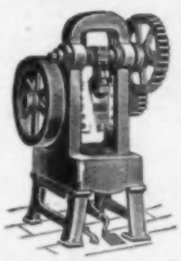

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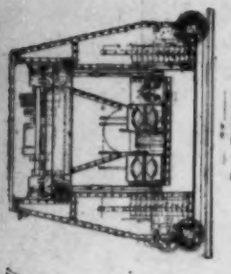

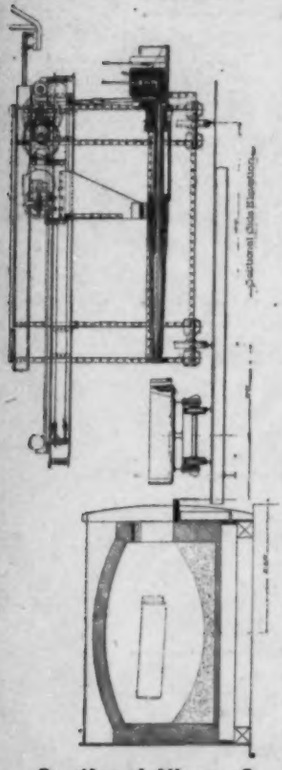

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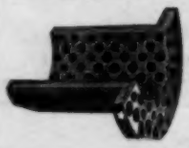

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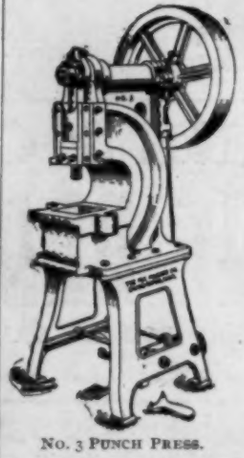

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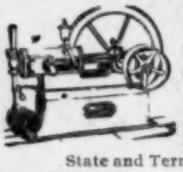

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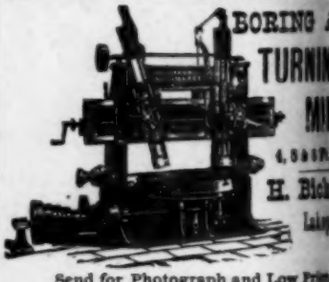

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